



We Are Columbia

Utilities & Engineering Department
Contracts

1136 Washington Street, Columbia, SC 29201 · Phone 803-545-3372 · Fax 803-545-3322

INTER OFFICE MEMORANDUM

TO: Ms. Teresa Wilson, City Manager

FROM: Kimberley R. Roof, Asst. Contracts Administrator

SUBJECT: **CITY COUNCIL AGENDA ITEM:** Contract Amendment #3 to the Agreement for Engineering Services between CDM Smith and the City for Design and Construction of Sanitary Sewer and Storm Drain Improvements in the Read Street Area; SS6884 (\$33,518.95), WM4179 (\$62,115.22) & SD8141(\$53,537.83)

Date: November 13, 2013 Initial:

The attached Contract Amendment #3 is for the design of and replacement of Junction Box #3 near the intersection of Harden and Calhoun Streets. In addition to, the design and support for dewatering Calhoun Street that had previously been a maintenance issue.

Staff has negotiated a fee totaling \$149,172.00 for the specified needs above with CDM Smith, a non-DBE firm located in Columbia, South Carolina. This project was originally awarded in November 2004 to Wilbur Smith & Associates who was bought out by CDM on February 25, 2011. CDMSmith inherited the consulting services at that time. The firms who provided additional assistance in the original Contract dated November 17, 2004 were: Civil Engineering consulting Services, a FBE/MBE firm located in Columbia, provided subsurface utility exploration assistance at 33.68% of the total Contract, Construction Support Services, a MBE firm located in Columbia, provided surveying services at 13.70% of the total Contract, Maxim Communications Group, a MBE firm located in Columbia, SC provided community input at 10.90% of the total Contract, and Geomech Group, Inc., a WDBE firm located in Columbia provided geotechnical drilling services at 4.73% of the total Contract.

The budget from the original Contract was funded from the following: Water, Sewer, and Storm Drain Improvements Funds (5529999-SS688401-636600, 5529999-WM417901-

636600, and 5549999-SD814101-636600). This Contract Amendment will be funded by funds not utilized in WM4282; SD8377 & SD8388 and SS-Misc.

This project will benefit City Council District #2. A construction service area map is enclosed. Pink highlight depicts the overall project area and the blue highlight depicts focus area for Contract Amendment #3.

The Legal Department has reviewed and approved Contract Amendment #3 and the Director of Utilities and Engineering and the Assistant City Manager for Operations recommends its approval.

/kr
Attachment

Cc: Mr. Joseph D. Jaco, P.E., Director of Utilities and Engineering
Ms. Dana R. Higgins, P.E., City Engineer
Mr. Michael F. Sheu, P.E., ACE for Construction
Mr. Bill Davis, Waste Water Engineer

**Agreement for Engineering Services for
Design and Construction of Sanitary Sewer and Storm Drain Improvements in the
Read Street Area; CIP Projects SS6884, WM4179, and SD8141**

CDM Smith (formerly Wilbur Smith Associates) and City of Columbia, SC

Contract Amendment #3
Date September 4, 2013

Description of Change: Request change in Agreement for Engineering Services between the City of Columbia (City) and CDM Smith (formerly Wilbur Smith Associates) (Engineer) undated but approved by City Council on November 17, 2004 (Agreement) to modify the Agreement in accordance with Attachment A hereto to add tasks to Section IV - Special Services to provide:

- A. Design of a Replacement for Junction Box #3
- B. Design and Support for Dewatering Calhoun Street Excavation

The scope of services and compensation for Contract Amendment Number 3 shall be in accordance with Attachment B attached hereto and incorporated herein by reference.

All other provisions of the Agreement, except as herein modified or changed, remain in full force and effect.

Proposed Change and Basis for Payment:

Original Contract Price:	\$ 361,232.00
Previous Change Orders:	399,560.00
This Change (addition):	\$ 149,172.00
Revised Contract Price:	\$ 909,964.00

Additional funds are to be provided in the following manner: Capital Improvements Program Budget, Fund Codes 5529999-SS688401-636600 and 5549999-SD814101-636600

This Change is Acceptable:

CDM Smith

By: _____
Title:

Robert B. Serrell
vice president

Recommended for Approval:



Director of Utilities
and Engineering

Recommended for Approval:

Assistant City
Manager for Operations

Approval of Change:

City Manager

APPROVED AS TO FORM
Parry 11.6.13
Legal Department, City of Columbia



1301 Gervais Street
Columbia, SC 29201
tel: 803-758-4500

SS6884 & SD8141
Attachment A
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September 4, 2013

Mr. Michael Sheu, PE
Utilities & Engineering Department
City of Columbia
PO Box 147
Columbia, SC 29217

Re: Contract Amendment #3
Read Street Sanitary Sewer & Storm Drainage Project
CIP Projects SD8141 and SS6884
CDM Smith Project #86166

Dear Mr. Sheu:

Under a previously executed contract for CIP Projects SS6884, WM4179, and SD8141 CDM Smith (formerly Wilbur Smith Associates) provided engineering design services for improvements to water, sanitary sewer, and storm drainage facilities in the vicinity of Read Street, Harden Street, and Calhoun Street. These improvements are currently being constructed by McClam Associates as part of the Rehabilitation and Streetscape North Harden Phase II. Circumstances encountered during construction led City staff to request that CDM Smith provide additional engineering services. These services have been provided and the circumstances have been resolved. The attached Contract Amendment #3 will serve to modify the previously executed contract to add these work items under Section IV - Special Services and compensate CDM Smith for the documented effort.

Section IV – Special Services shall be modified to add the following:

- A. Junction Box #3
 - 1. Design comprehensive solution to aging junction box to account for unknown conditions discovered during the construction process

- B. Calhoun Street Dewatering
 - 1. Preliminary investigation, evaluation of conditions, and schematic design of dewatering system
 - 2. Responding to contractor's questions, reviewing submittals, and supporting City's decision to dewater
 - 3. Observation of dewatering installation, start-up, and trouble-shooting early operation
 - 4. Daily observation of dewatering operation, tracking monitoring well data, and supporting City's effort to encourage the contractor to move to construction

The work proposed is described in detail on the following pages.



Mr. Michael Sheu, PE
September 4, 2013

SS6884 & SD8141
Attachment A
Page 2 of 3

I. DESCRIPTION OF CHANGE ORDER WORK REQUIRED

Engineering services included the following tasks:

- A. Junction Box #3
 - 1. Design comprehensive solution to aging junction box
 - a. *Performed field investigations of newly revealed box condition*
 - b. Identified and evaluated options for achieving solution
 - c. Designed comprehensive solution and produced construction drawings

- B. Calhoun Street Dewatering
 - 1. Preliminary investigation, evaluation of conditions, and design of dewatering system
 - a. Performed field investigations
 - b. Evaluated data from existing records and new borings
 - c. Designed a custom filtered well point vacuum dewatering system for this site
 - d. Met with City and contractor as needed

 - 2. Responding to contractor's questions, reviewing submittals, and supporting City's decision to dewater
 - a. Answered contractor's questions concerning the design
 - b. Reviewed dewatering subcontractor's submittal
 - c. Met with City and contractor as needed

 - 3. Observation of dewatering installation, start-up, and trouble-shooting early operation
 - a. *Performed constant observation of well point installation*
 - b. Observed start-up of the dewatering system
 - c. Investigated inability of the system to accomplish its goal quickly as operated by the contractor
 - d. Met with City and contractor as needed to discuss and highlight operational shortcomings

 - 4. Daily observation of dewatering operation, tracking monitoring well data, and supporting City's effort to encourage the contractor to move to construction
 - a. *Observed operation of the dewatering system daily*
 - b. Tracked and interpreted monitoring well data



Mr. Michael Sheu, PE
September 4, 2013

SS6884 & SD814J
Attachment A
Page 3 of 3

- c. Provided data and professional advice by highly experienced personnel to the City
- d. Met with City and contractor as needed to discuss and highlight operational shortcomings

II. COMPENSATION

The Client shall compensate the Consultant for services provided under this Proposal in accordance with the following:

- A. For services rendered under DESCRIPTION OF CHANGE ORDER WORK REQUIRED – Item I.A compensation to the ENGINEER shall be a lump sum of \$13,060.
- B. For services rendered under DESCRIPTION OF CHANGE ORDER WORK REQUIRED – Item I.B compensation to the ENGINEER shall be a lump sum of \$136,112.
- C. The total additional fee will be a lump sum of \$149,172.
- D. Due to the nature of this work and the short time frame required to support the construction schedule, no sub-consultants were used.

III. PAYMENT SCHEDULE

Because the services have already been provided, the amounts due will be included in the next regular monthly invoice to the Client following approval of Contract Amendment #3.

If you have any questions or need additional information please contact me anytime by telephone at 803-251-2979 or by e-mail at cullerre@cdmsmith.com.

Sincerely,
CDM Smith

Richard E. Culler, PE
Project Manager

c: File

Attachment B

Contract Amendment #3 Design and Construction of Sanitary Sewer and Storm Drain Improvements in the Read Street Area CIP Projects SS6884 & SD8141 CDM Smith Project #86166

This Attachment provides a more detailed documentation of the circumstances leading to and effort expended leading to the Contract Amendment #3

Design of a Replacement for Junction Box #3

The scope provided for the design of the new storm drainage system improvements to interconnect with the existing storm drainage system, including an existing junction box near the intersection of Harden Street and Calhoun Street, designated as Junction Box #3. The only information available on the existing structure of Junction Box #3 was that which could be observed from inside the box with access through a manhole. The design of the new structure to tie to Junction Box #3 was based on that limited information and assumptions extrapolated from those observations.

During construction, in preparation to install the improvements, the contractor opened the top of the existing Junction Box #3 and observed cracks in the walls. The contractor contacted CDM Smith, which investigated their concerns. On January 15th two CDM Smith engineers, one of them a structural engineer, entered the existing junction box to review the current conditions. The wall that the storm drainage extension was to tie into was found in apparent good condition with no noticeable cracks. From the review, it appeared that doweling into the existing brick wall would be acceptable. Cracks in several of the other walls were noted as was some other damage, however, the areas of concern were beyond the design scope for the new storm drainage. CDM Smith advised that should the City wish to repair the cracks in the existing walls, they could develop suitable details and could even explore options that would not require replacing the walls.

The next week, as the contractor proceeded toward the installation and excavated away the earth from around the outside of existing Junction Box #3, problems invisible from inside the box became noticeable. It was clear that the existing structure was not as it appeared from the inside. There was no foundation under the box; what had appeared to be a foundation was only a concrete floor poured in the bottom of the original excavation between the box walls after they had been placed. The walls of the box were found to be only a single width of brick thick, not two or three as had been assumed when viewed from the inside. The new drainage design was based on tying the new structure to the existing foundation and existing walls. However, once it was understood from viewing the uncovered structure that there was no foundation and the existing brick walls were too thin to support the dowels construction could not proceed.

In a telephone conversation between Michael Sheu and Richard Culler on the morning of January 22, 2013, the City requested that CDM Smith design a comprehensive solution to address all issues with the existing box, with the contractual issues to be worked out later to cover this out-of-scope work. Several options were considered, but after consulting with the contractor, it was decided to design an entirely new structure to replace the old box, which would be removed by the contractor before installing the new. The new structure would be designed to tie to the existing drain pipes and to the new drainage system improvements. The top design for the previously provided tie-in design would have to be discarded in favor of a new top design appropriate to the entire new structure.

This new design was completed and delivered to the City in February. The total cost incurred to investigate the situation, arrive at and design a comprehensive solution was \$13,060.

Design and Support for Dewatering Calhoun Street Excavation

The 16-inch diameter sanitary sewer outfall line to be installed along Calhoun Street was designed at invert elevations between 228.0 and 229.5. This was deeper than the existing 12-inch diameter sewer it was replacing due to the need to remove an inverted siphon in the existing line at Calhoun and Harden streets, which was a maintenance issue for the City.

Geotechnical Test Boring #1, located near Manhole #5, indicated groundwater and poor soil conditions above the invert elevation of the pipe indicating it would likely be necessary for the contractor to dewater and stabilize the excavation in Calhoun Street in order to install the gravity sewer. The contract documents included this geotechnical boring data and required all costs for trench stabilization and dewatering to be included in the unit price bid for the sewer installation as detailed below:

The Special Provisions include:

- "64.3 Any costs associated with trench stabilization including but not limited to use of sheeting, shoring, bracing, dewatering, and trench boxes shall be borne by the contractor. There will be no direct payment for this item, the cost of which shall be included in the unit bid prices for pipe installation."
- "65.4 Utility installation subgrade has a high potential to extend below the existing groundwater surface. Contractor should anticipate well point system to dewater the excavation. The well point system should be installed by a contractor who is knowledgeable and experienced in the installation and operation of dewatering systems. The excavated areas shall be monitored to prevent damage to any structures through settlement as water is withdrawn. If practical an alternative to wells points, the contractor may elect to use sumps and pumps to maintain water control during the excavation process. No additional cost will be paid for this work, all cost shall be included in other bid items i.e. water lines, sanitary sewer lines, etc."
- "65.5 There will be no direct payment for dewatering and any necessary testing, the cost of which shall be included in bid prices for pipe installation. The Contractor shall maintain access to adjacent areas at all times."

The General Notes on Sht. 2 of the Plans include:

- "5a. All excavation for this project is unclassified. Including excavation for storm drain pipes, box culverts and other structures, the cost of excavation for these facilities shall be included in the price bid for each item. This shall include excavation of solid materials, "muck"; and dewatering if necessary. When excavating, all unsuitable materials encountered shall be removed from the project and disposed of."
- "8a. The contractor shall be responsible for necessary dewatering utilizing acceptable measures as approved by the engineer. All dewatering flows are to be settled in siltation basins or directed through filtering devices before discharge to stabilized sites, such as streams or storm sewers, not into exposed soils, stream banks, or any site where the flow

could cause erosion or siltation. Cost to be included in the various items of this contract, no separate payment will be made."

These notes and the design approach to handling the high groundwater were developed in close coordination and direction by the City Project Manager (Linda Moroz).

In November 2012, installation of the 16-inch sewer proceeded upgrade through the mental health property to Manhole #5 in Calhoun Street. After setting Manhole #5 the contractor encountered poor soil conditions (running sand), which halted his progress. The contractor took the position that the sewer could not be constructed as designed in these soil conditions; that the soils could not be dewatered or otherwise stabilized without extra-ordinary techniques and that it was a change of conditions. Upon investigation the engineer took the position that the conditions could be corrected by a properly designed, installed, and operated dewatering system. Further, that the conditions were known in advance as detailed in the boring data provided and warned of in Special Provision 65.4. And as stated in Special Provisions 64.3, 65.4, and 65.5 and in General Notes 5a and 8a that the responsibility for the cost of dewatering and stabilization were, per contract, to be borne by the contractor.

The City requested that CDM Smith design a dewatering system capable of dewatering the site with the contractual issues to cover this out-of-scope work to be worked out later. Once designed, the dewatering system would be installed and operated by the contractor. Using test results from material samples collected by the contractor's boring subcontractor, the engineer designed a vacuum wellpoint system schematic with filtered wellpoints to prevent soils from being pumped away with the groundwater and three pairs of monitoring wells to observe the progress. Per the special provisions and contractor notes, the City could have required this to be performed and paid for by the contractor.

The City then requested that CDM Smith provide continuous observation of the wellpoint installation to ensure they were installed as designed. A CDM Smith engineer was on the site observing and recording notes throughout the installation process.

The contractor began operating the dewatering system, but over time the groundwater levels did not drop as quickly as projected by the dewatering system designers. The contractor took the position that he had taken throughout; that the soils could not be dewatered and the dewatering system had accomplished all that it could. CDM Smith investigated the issue and documented that the vacuum pressure in the system was not adequate to properly drawdown the groundwater. CDM Smith further ventured the opinion that the dewatering system was not being operated by individuals knowledgeable and experienced in the operation of dewatering systems in these conditions. Further, our experts immediately found it non-typical to operate so many wellpoints off a single vacuum pump. In response, the contractor separated the single vacuum header into two systems and added a second vacuum pump in order to achieve greater vacuum pressures. He also assigned one of his more experienced foremen to operate the dewatering system. At this time the City requested that CDM Smith provide extensive observation of the dewatering operation and provide alerts when issues were observed. A CDM Smith engineer visited the site a minimum of once a day over the next four weeks and documented the operation of the system and the efforts of the new operator.

In the coming weeks the groundwater levels dropped to the elevation of the pipe on the west end of the site and to higher elevations at the other monitoring wells. The contractor claimed that the water levels needed to be several feet below the bottom of the excavation to allow him to safely begin installation. CDM Smith offered the opinion that while lower groundwater levels would be

preferred, the conditions at that time were workable as the hydraulic head had been removed and a sufficiently experienced contractor could accomplish pipe installation at those levels.

The contractor set a date to restart the sewer construction and was successful in construction of the gravity sewer as designed.

Compensation

The lump sum compensation for the Consultant for services provided under this Contract Amendment #3 is based on the actual hours spent performing the tasks and the direct costs incurred.

- For services rendered for designing a replacement Junction Box #3, compensation to the Consultant shall be a lump sum of \$13,060.
- For services rendered in association with the dewatering of the Calhoun Street excavation, compensation to the Consultant shall be a lump sum of \$136,112.

Total compensation for the various tasks associated with these two items shall be a lump sum addition of \$149,172.

READ STREET IMPROV.

