990 Hammond Drive, Suite 400
Atlanta, Georgia 30328

T: 770.394.2997
F: 770.396.9495

December 12, 2014

Mr. David R. Hatabian, P.E.
City Engineer|Reservoir Manager
City of Canton
151 Elizabeth Street
Canton, GA 30114

16-041202.010

Subject: Proposal for Inflow and Infiltration Reduction Study

Dear Mr. Hatabian:

Brown and Caldwell (BC) is pleased to present this proposal for engineering services to perform the initial phase of the City of Canton's Inflow and Infiltration Program. The proposal includes the following information for your consideration:

- Project Understanding
- Scope of Services
- Project Team
- Estimated Fee
- Schedule

## Project Understanding

The City of Canton is experiencing significant impacts on its sewer system due to rainfall-induced inflow and infiltration (RDII). This is having an impact on the available wastewater treatment capacity. It was has been reported that one inch of rain results in around 1 mgd of RDII. In October, a ±5-inch, 24-hour storm resulted in the flow increasing from around 3.9 mgd (ADWF) to 5.8 mgd. Several sections of the sewer system surcharge following significant rainfall events and some areas are reported to flood.

The City of Canton is interested in a phased 'Find-and-Fix' program to systematically reduce inflow and infiltration and to get the best return on the investment, while increasing the available capacity in the sewer collection system and at the WWTP.

The City of Canton has engaged BC to assist with development of a phased 'Find-and-Fix' program. This proposal describes the first 'Find-and-Fix' task, which will be used to rank all the sewer sub-basins in terms of highest to lowest inflow and infiltration. This ranking will then serve as a road map for the 'Find-and-Fix' program.

BC will work with City staff to select two of priority sewer sub-basins for an initial sewer evaluation study. Rehabilitation and repairs of the sewer system identified during the study will be performed in these priority sewer sub-basins by contractors retained by the City. The impact of the rehabilitation and repairs on the RDII will be evaluated and whether further rehabilitation and repairs will be required.

# Scope of Services

The project approach will include the following tasks:

## Task 1: Project Management

### 1.1 Kickoff Meeting

Immediately after receiving the Notice to Proceed, the BC team will schedule a meeting to kick off the project with City of Canton staff. This task typically includes introductions of project personnel, establishment of lines of reporting and communication, confirmation of project scope and schedule. Any needed data from the City and needed City support during the study will be discussed.

### 1.2 Progress Meetings/Calls

BC proposes to meet/call with City of Canton staff on a monthly basis to review progress. The meetings will serve to review progress against the project schedule. The meetings will an opportunity to present new issues and address any outstanding issues. These meetings may comprise telephone conferences or team meetings at City of Canton's offices. BC has assumed up to six face-to-face progress meetings.

### 1.3 Scheduling and Project Controls

After receiving the Notice to Proceed, BC will develop a Project Management Plan (PMP) that will serve as a "road map" for the entire project. The PMP will contain the scope of the project by tasks and work breakdown structure, project and task schedule and budgets, the responsibilities of each project team member, and communication procedures. The PMP will include a schedule, which will be used to track progress throughout the project.

BC will prepare a monthly progress report, which will be presented at the progress meetings and also submitted with BC's invoices.

**Task 1 Deliverables**

- Project Management Plan
- Up to 12 monthly progress reports

## Task 2: Data Review

This task will involve the following activities:

### 2.1 Desktop Review and Analysis

A desktop review and analysis will be performed of the various data provided by the City of Canton:

- ArcGIS layers with planimetric, sewer and water data
- List of 33 pump stations and name plate capacities
- Pump station hour meter data for all pump stations
- Wastewater treatment plant flow meter

- Location of overflows or customer complaints
- Other applicable data

The main objectives of the review and analysis are to:

- Obtain a detailed list of assets including the number of feet of sewer for various pipe diameters and materials and number of sewer manholes
- Further delineation of the sewer sub-basins if required
- Location and schematic of pump station connectivity
- Identify the sub-basins with the highest potential inflow and infiltration based up-on the hour meter analysis, complaint location and other information
- Prepare a sewer sub-basin ranking from lowest to highest inflow and infiltration reduction potential
- Prepare a map grid and set of (11" x17") map books, which can be used during site visits and sewer evaluation

### 2.2 Sub-basin Ranking Review and Site Visit

BC staff will meet with City of Canton staff to review the priority sub-basins identified from the desktop review and analysis. This will be followed by a site visit to evaluate where there are known system defects or deficiencies. The meeting and site visit with City of Canton operations staff is anticipated to require a full day. The findings of the site visit will be used to revise the sub-basin ranking.

### 2.3 Overview of Sewer System and Sub-basin Ranking

In order to conclude its findings of the desktop analysis and site visit, BC will prepare a technical memo. An overview of the sewer system will be provided including a break-down of the sewer system pipe, manhole and pump station asset information. A map will be included showing the sewer sub-basins, including the location of 33 sanitary sewer pump stations.

The review and findings of the sewer sub-basin ranking will presented. The memo will include a recommendation on which sewer sub-basin or basins will be initially evaluated. It is assumed that two of the sewer sub-basins will be studied under the initial "Find-and-Fix" task.

**Task 2 Deliverables**

- Tech Memo 1. Overview of Sewer System and Sub-basin Ranking
- Map Grid and Sewer Map Book

## Task 3: Sanitary Sewer Evaluation Study

BC proposes to conduct a sanitary sewer evaluation study (SSES) of the highest priority sewer sub-basins. The evaluation will involve a smoke testing study, sewer manhole inspections and limited flow monitoring. The SSES will not include sewer cleaning and CCTV inspection, as this will be performed during **Rehabilitation and Repairs** (Task 4).

All field crews will be equipped with a tablet and mobile app containing electronic inspection forms and maps of the City of Canton's sewer system. The tablets will be

used to take digital photos to record condition of sewer assets and defects during smoke testing and manhole inspections. Through synchronization of the tablets, all data is stored in servers in a Cloud. The data collected from the fieldwork will then be incorporated into a geo-database, serving as a cornerstone for subsequent design tasks.

### 3.1 Smoke Testing Study

Smoke testing will be primarily performed by BC's subcontractor, Diagnostic Resources and Solutions (DRS). BC will provide oversight and direction and will perform QA/QC.

The objective of smoke testing is to detect sources of inflow such as holes in manhole structures, storm drain cross connections and point source inflow leaks in drainage paths or ponding areas, roof leaders, cellar, yard and area drains, fountain drains, abandoned buildings, and faulty service connections, etc.

In order to identify these defects, non-toxic smoke will be forced into the sewer by high-capacity blowers capable of achieving at least 53 cfs airflow. Up to three line segments or approximately 1,000 linear feet will be tested at one time. The maximum length of sewer to be smoke tested in a single setup shall be such that smoke is generated at a density sufficient to detect smoke emissions and ensure smoke travels throughout the test section.

Smoke testing will not be performed during or following weather conditions that may impair detecting escaping smoke (i.e. very windy, rainy, snowy days, or high groundwater conditions, etc.) The smoke shall be non-toxic, odorless, and non-staining. A Material Safety Data Sheet will be provided to the City of Canton prior to the commencement of smoke testing for review and approval. The project team will furnish materials, equipment, supplies, traffic control and personnel to perform and document the smoke testing.

One week prior to commencement of testing, BC will submit a schedule outlining test dates and locations to the City of Canton. BC will prepare smoke testing notices advising residents and local authorities of the smoke testing study. The notices will be submitted to the City of Canton for approval prior to distribution. Copies of the notices will be provided to City agencies, including the fire department, police, emergency services and others.

BC will arrange for distribution of smoke testing notices (door hangers) to residences in the project area including the local fire and police precincts, approximately 48 hours in advance of the smoke testing. For large facilities such as schools or hospitals, a log will be maintained that documents the property manager's notification of planned smoke testing activities. A local telephone number will be provided for those individuals with questions or for anyone requiring special assistance. Field personnel will be uniformed and will conspicuously display identification badges. Private individuals requesting additional identification will be asked to contact the City of Canton and crews shall carry letter from the City of Canton authorizing the holder of the letter to perform the work described. Each day the fire and police departments will be notified of the crew location since smoke may enter homes through defective plumbing.

DRS field crews will use tablets pre-loaded with electronic forms to capture the results of the smoke testing. DRS will record the location of structural defects such as holes in manhole covers, holes or cracks in manholes, missing or broken cleanout covers, illicit storm drain connections and other defects. All defects will be photographed, flagged, and coordinates will be recorded using mapping grade GPS.

A white board will be used to make a field sketch of each smoke test setup, indicating which sections were being tested, where the blower was located, and where defects were found. The tablet will be used to photograph the filed sketch.

Based upon previous experience, 6,000-10,000 linear feet of sewer is the typical range for testing on a daily basis. The **Estimated Fee** assumes that DRS will spend up to five days performing smoke tests of the sewer system. Assuming 6,000 feet per day of smoke testing, BC plans to smoke test approximately 30,000 feet of sewer.

### 3.2 Manhole Inspections

Manhole inspections will be primarily performed by BC's subcontractor, ACR Engineering (ACR). BC will provide oversight and direction and will perform QA/QC. Inspections shall be conducted in accordance with NASSCO MACP Level 1. Some of the useful MACP Level 2 component information will also be included such as sewer pipe diameters, materials, rim to invert information, etc.

Manhole inspections will be carried out after the smoke testing study is completed. BC will make a determination of which manholes to be inspected in the priority sewer sub-basins. These will include the manholes with defects identified during the smoke testing.

Inspections will be conducted for each manhole in the areas identified in the priority sewer sub-basins. The objective of manhole inspection is to detect sources of inflow and infiltration, as well as determine the structural condition of the manholes. The inspections will include surface, manhole cover and frame, chimney, walls, invert and all appurtenances.

The ACR inspection crew will have a tablet pre-loaded with inspection forms and GPS to help locate the manholes. The crew will open each manhole, complete the manhole inspection form and record the manhole condition. The inspection crew will take at least three photos per manhole using the tablet: one showing the manhole location, the other a top view of the manhole to show incoming pipes and the other photo will be of a white board marker with a sketch showing the upstream and downstream manholes. Additional photos will be taken if there are visible structural defects.

The inspection crew will record the orientation of all incoming and outgoing pipes relative to the outgoing pipe (conventionally designated as 6 o'clock).

The inspection crew will have a pole camera to inspect the condition of all sewer pipes at the point of entry or exit to the manhole. The camera will be used to check the pipe material and diameter. If there are visible pipe defects, still photos will be taken using the camera.

Inspection crews will make a diligent effort to locate all manhole structures in the study area. Efforts shall include using metal detectors, probe rods, shovels, etc. for up to 15 minutes per manhole. Manholes buried more than 6 inches and manholes that could not be located or could not be opened will be documented with a photograph or sketch, address, etc. A list of these manholes requiring further action will be provided to the City of Canton.

Based upon previous experience, around 20 manholes is the typical number of manholes, which can be inspected by an inspection crews on a daily basis. This assumes that the manholes can be readily located within a right-of-way or easement and that the manhole cover can be opened. The **Estimated Fee** assumes that the BC team will spend up to 15 days in performing manhole inspections. Assuming 24 manholes per day are inspected and one inspection crew, BC plans to inspect up to 300 manholes.

### 3.3 Installation of Temporary Flow Monitors

In order to determine the pre- and post-rehabilitation impacts on the priority sewer subbasins, BC recommends the purchase or lease of at least two flow meters and two rain gages by the City of Canton. As the flow monitoring period will be in excess of four months, leasing equipment is more expensive than the purchase option. The other benefit of purchasing flow meters and rain gages is for use in subsequent "Find-and-Fix" projects.

BC will assist the City of Canton in specifying the flow meter and rain gage equipment. It is assumed that the City will then arrange for the installation, calibration and monitoring of the two area velocity type flow meters and two rain gages using City staff, Utility Partners, or a contractor retained by the City..

It is anticipated that the flow meters and rain gages will be installed prior to the Smoke Testing Study and Manhole Study, so that the pre-rehabilitation flows can be determined. The flow meters will monitor flow for six months after the Rehabilitation and Repairs (Task 4) are completed.

#### Exclusion

BC's **Estimated Fee** does not include the costs of the lease or purchase of the temporary flow meters. The fee also does not include the costs of calibration and ongoing maintenance of the flow meter.

### 3.4 Tech Memo on the Findings and Recommendations of the SSES

The details and findings of the smoke testing and manhole inspections will be documented in a Tech Memo. BC will identify which sections of the sewer will need to be rehabilitated and by what methods. The Tech Memo will document the results of the pre-rehabilitation flow monitoring.

The Tech Memo will include drawings showing the location and type of sewer defects that will require rehabilitation and repairs. An opinion of the probable construction cost will be provided for fixing the problems identified during the SSES.

The Tech Memo will include recommendations on how to monitor the sewer system after the initial repairs have been completed.

The Tech Memo will list manholes, which could not be located or accessed.

### 3.5 Workshop

BC will conduct a workshop with City of Canton staff to review the results of the SSES and recommended repairs and rehabilitation. A key objective of the workshop will be to align the number and estimated cost of repairs and rehabilitation with the City's budget allocation.

#### Task 3 Deliverables

- Technical Memo 2. Findings and Recommendations of SSES

## Task 4: Rehabilitation and Repairs

This task is focused on fixing the defects identified during the SSES and installing temporary flow meters for evaluating the impact on inflow and infiltration. BC will assist the City of Canton with retaining one or more on-call contractors to perform the rehabilitation and repairs.

### 4.1 On-Call Contractors

It is assumed that the City of Canton will make use of its existing on-call utility contractor or Utility Partners for minor sewer repairs. For more complex rehabilitation methods, e.g. cementitious or epoxy lining of manholes or sewer pipe lining, spot repairs or pipe bursting, pipe cleaning and CCTV, it is anticipated that the City of Canton will require additional on-call contractors.

BC will assist the City of Canton in the selection of one or more utility contractors with the capability of performing the various types of sewer rehabilitation and repairs and also services such as sewer cleaning and CCTV inspection.

BC will assist the City in procuring on-call contractors by providing the following:

- A proposed bid form including all bid items anticipated for sewer rehabilitation work
- Technical specifications
- Answering questions during the bid period
- Attending a pre-bid conference
- Providing a bid award recommendation

The City of Canton will provide the remaining items to complete the on-call contractor bid package including:

- Front-end documents such as the agreement and insurance requirements
- All other bid requirements

Upon receipt of the on-call contractor bids, BC will work with the City to estimate the bid quantities that are anticipated over the initial one-year period, and apply them to the contractor unit bid items to establish the low bidder(s). The City will then proceed to contract with the recommended on-call contractor(s).

### 4.2 Pre-Construction Meeting and Progress Meetings

BC anticipates having one meeting with the City of Canton and their on-call contractors prior to starting the minor repair work.

BC staff will attend monthly Progress Meetings at the project site. It is assumed that meetings will be held for duration of 3 months.

**Exclusion**

It is assumed that the City of Canton engineering staff will be responsible for providing construction administration and inspection services during construction. BC can provide an estimate for these services upon request.

### 4.3 Contractor Submittal Review

BC staff will review the various on-call contractors' submittals, shop drawings, samples, etc. It is assumed a total of up to 10 shop drawings and resubmittals will be submitted by the contractors for review. BC will maintain a log for submittals submitted by the contractors. The level of effort for this task will be dependent upon the Contractor.

BC will provide review of the CCTV inspections performed during the Contract and monitor for conformance with specifications.

### 4.4 Review RFIs, Differing Site Conditions, and Potential Change Orders

BC staff will review RFIs, differing site condition claims and possible change orders pertaining to the project. RFI responses will be given to the on-call contractors and claims of differing site conditions potential change orders will be reviewed with the City of Canton. It is assumed that up to 6 RFIs and 1-3 claims of differing site conditions and potential change orders will be issued during the project. BC will maintain an RFI log and a log of differing site conditions and potential change orders that will be reviewed during the monthly meetings. The level of effort for this task will be dependent upon the on-call contractors.

### 4.5 Record Drawings and CCTV Inspection Reports

Following completion of construction, BC will take the 'red-lined' documents and update the City of Canton's GIS sewer information.

The Contractor will provide the results of the CCTV inspections to BC for review and analysis. The CCTV inspection videos and reports will be provided to City of Canton.

**Task 4 Deliverables**

- Draft documents to include with the pre-selection and ITB for On-Call Contractors, e.g. pre-selection forms, drawings, bid tab, specifications.
- Respond to up to 6 RFIs during bidding
- Contract documents including bid tab, drawings and specifications
- Respond to up to 6 RFI's during construction
- Respond to up to 3 claims for potential change orders

## Task 5: Impact on Inflow and Infiltration

### 5.1 Post Repair Monitoring

After the rehabilitation and repairs have been completed, it is proposed to monitor the flows in the priority sub-basins for at least six months using the temporary flow meters. At least six months is considered necessary to assess the impacts of the sewer system improvements.

BC will also review the pump hour readings of pump stations in the priority sewer sub-basins.

BC will analyze the flow meter and pump hour readings to estimate the pre- and post-rehabilitation impacts on the system.

### 5.2 Technical Memorandum

To complete the initial 'Find-and-Fix' task, BC will prepare a Tech Memo which will include the following sections:

- Overview of System
- Data Review and Sub-basin Ranking
- SSES of Priority Sub-basins
- Completed rehabilitation and repairs to within Priority Sewer Sub-basins
- Impact on Inflow and Infiltration
- Recommendations for Further Rehabilitation and Repairs
- Further Tasks

**Task 5 Deliverables**

- Technical Memo 3 Final Inflow and Infiltration Study

# Project Team

BC's team will include Rob Bocarro, P.E. as Project Manager and will be supported by Sean Kilpatrick, P.E. as the team's GIS Manager. BC's principal will be Craig Ferguson, P.E., BCEE.

The BC team will also include two subcontractors: ACR Engineering and Diagnostic Resources and Solutions.

ACR Engineering (ACR) will be responsible for manhole inspections.

Diagnostic Resource and Solutions (DRS) will be responsible for smoke testing.

## Estimated Fee

Based upon the above scope of services, the estimated fee is presented below:

| Fee Estimate (rounded to the nearest $100) | |
|---|---|
| **Cost Item** | **Cost** |
| BC Fee | $99,500 |
| Manhole Inspections: ACR | $18,600 |
| Smoke Testing: DRS | $14,900 |
| **Total** | **$133,000** |

A more detailed breakdown of the estimate is provided in Attachment A.

The hourly rates for professional services and unit prices are presented in Attachment B.

## Schedule

It is anticipated that the project would take approximately 12 months to complete, based upon the following activities:

- Task 2: Data Review: 1 month after kickoff meeting
- Task 3: SSES: Two months for smoke testing, manhole inspections and SSES Tech Memo. Flow monitoring will start prior to Smoke Testing and Manhole Inspections
- Task 4: Rehabilitation and Repairs: 3 months. Note that the procurement of on-call contractors will start after kickoff. On-call contractors will be available to start work prior to the commencement of Task 4.
- Task 5: Impact on Inflow and Infiltration: 6 months for post rehabilitation flow monitoring and preparation of final tech memo.

## Terms and Conditions

BC proposes to perform the services described above in accordance with the terms and conditions of the Master Service Agreement between the City of Canton and BC dated December 3, 2014.

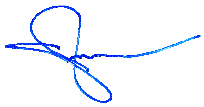
Please contact Craig Ferguson at (770) 673-3655 or Rob Bocarro at (770) 673-3642 if you have any questions or comments or if you would like to meet to discuss our proposal. We would also like to know your preference regarding the preparatory construction work so we can propose the applicable contract.

We look forward to being of service to the City of Canton on this important project.

Very truly yours,

**Brown and Caldwell**

Rob Bocarro, Ph.D., P.E.
Project Manager



Craig A. Ferguson, P.E., BCEE
Vice President

RAB:CAF:dcm

cc:

Attachments (2)

1. Attachment A: Estimated Fee Breakdown
2. Attachment B: Schedule of Hourly Rates

# ATTACHMENT A

| Canton, City of (GA) -- Inflow-Infiltration Study | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Phase | Phase Description | Total Labor Hours | Total Labor Effort | APC | Total ODCs | Total Sub Cost | Total Expense Cost | Total Expense Effort | Total Effort |
| **001** | **Project Management** | **154** | **24,750** | **1,078** | **35** | **0** | **35** | **1,113** | **25,863** |
| 001 | Kickoff Meeting | **16** | 2,880 | 112 | **35** | **0** | **35** | **147** | **3,027** |
| 002 | Progress Meetings/Calls | **72** | 12,720 | 504 | **0** | **0** | **0** | **504** | **13,224** |
| 003 | Scheduling & Project Controls | **66** | 9,150 | 462 | **0** | **0** | **0** | **462** | **9,612** |
| **002** | **Data Review** | **82** | **9,640** | **574** | **0** | **0** | **0** | **574** | **10,214** |
| 001 | Desktop Review and Analysis | **36** | 3,700 | 252 | **0** | **0** | **0** | **252** | **3,952** |
| 002 | Sub-basin Ranking Review | **16** | 2,400 | 112 | **0** | **0** | **0** | **112** | **2,512** |
| 003 | Overview of Sewer System | **30** | 3,540 | 210 | **0** | **0** | **0** | **210** | **3,750** |
| **003** | **Sanitary Sewer Evaluation Study** | **208** | **23,790** | **1,456** | **278** | **33,534** | **33,812** | **38,622** | **62,412** |
| **** | Default Task | **0** | 0 | 0 | **35** | **0** | **35** | **35** | **35** |
| 001 | Smoke Testing Study | **44** | 4,840 | 308 | **104** | **14,904** | **15,008** | **16,807** | **21,647** |
| 002 | Manhole Inspections | **44** | 4,840 | 308 | **104** | **18,630** | **18,734** | **20,905** | **25,745** |
| 003 | Install & Monitor Temp Flow Meters | **32** | 3,560 | 224 | **0** | **0** | **0** | **224** | **3,784** |
| 004 | Tech Memo on SSES | **60** | 6,210 | 420 | **35** | **0** | **35** | **455** | **6,665** |
| 005 | Workshop | **28** | 4,340 | 196 | **0** | **0** | **0** | **196** | **4,536** |
| **004** | **Rehabilitation and Repairs** | **182** | **20,830** | **1,274** | **174** | **0** | **174** | **1,448** | **22,278** |
| 001 | Bidding Phase | **48** | 6,440 | 336 | **35** | **0** | **35** | **371** | **6,811** |
| 002 | Pre-Construct & Progress Mtgs | **80** | 8,480 | 560 | **139** | **0** | **139** | **699** | **9,179** |
| 003 | Contract Submittal Review | **12** | 1,230 | 84 | **0** | **0** | **0** | **84** | **1,314** |
| 004 | Review RFIs | **14** | 1,400 | 98 | **0** | **0** | **0** | **98** | **1,498** |
| 005 | Record Drawings | **28** | 3,280 | 196 | **0** | **0** | **0** | **196** | **3,476** |
| **005** | **Impact on Inflow and Infiltration** | **106** | **11,550** | **742** | **0** | **0** | **0** | **742** | **12,292** |
| 001 | Post Repair Monitoring | **32** | 2,920 | 224 | **0** | **0** | **0** | **224** | **3,144** |
| 002 | Tech Memo | **74** | 8,630 | 518 | **0** | **0** | **0** | **518** | **9,148** |
| | **GRAND TOTAL** | **732** | **90,560** | **5,124** | **487** | **33,534** | **33,986** | **42,498** | **133,058** |

# ATTACHMENT B

## Unit Labor Rates
## Brown and Caldwell

| Labor Category | Hourly Unit Labor Rate |
|---|---|
| Principal | $195 |
| Managing Professional/Senior Project Manager/Senior Task Leader | $190 |
| Supervising Professional | $175 |
| Principal Professional/Project Manager/Task Leader | $145 |
| Principal Designer | $145 |
| Senior Professional | $135 |
| Senior Designer/Professional Engineer | $110 |
| Technical Editor/Public Relations | $95 |
| Technical Coordinator | $105 |
| Project Engineer I/II | $85 |
| Project Geologist/Scientist/Hydrogeologist | $75 |
| Project Analyst | $75 |
| Permitting Technician | $65 |
| CADD Technician/Administrative Support/Clerical | $60 |
| Survey Technician | $90 |
| 2-Person Survey Crew | $140 |
| 3-Person Survey Crew | $165 |
| Land Survey Manager | $125 |
| Construction Field Technician | $85 |
| Construction Engineer | $110 |
| Construction Manager | $145 |
| 2-Person Manhole Inspection Crew (ACR) | $1,200 per day |
| Smoke Testing – in right of way (DRS) | $0.38 per linear foot of sewer |
| Smoke Testing – in easements (DRS) | $0.48 per linear foot of sewer |

Hourly labor rates listed above include salary, fringe benefits, general and administrative overhead and profit, and are valid for calendar year 2014 and 2015. In lieu of invoicing for certain reimbursable expenses, an Associated Project Cost (APC) of $7 per labor hour charged will be invoiced to cover network infrastructure and information systems support, CAD and computer usage, in-house reproduction services including graphics and photocopying, printing, long distance telephone calls including cell phone charges, facsimile, postage, overnight and courier services. Other direct costs not included in the APC will be invoiced at cost. Subcontractor fees will be invoiced at actual cost, plus an administrative fee of 10 percent.