SECOND AMENDMENT TO PROFESSIONAL SERVICES AGREEMENT

STATE OF TEXAS §

COUNTY OF BEXAR §

This Second Amendment to the Professional Services Agreement regarding the Underground Storm Drain Video Inspection Program, is entered into by and between the City of San Antonio ("City"), a home rule municipal corporation, and RJN Group, Inc. ("Consultant"), referred to collectively herein as the "Parties".

WHEREAS, on March 30, 2017 through Ordinance 2017-03-30-0195, the City and Consultant entered into a Professional Services Agreement for an amount not to exceed $4,250,000; and

WHEREAS, the Parties wish to execute an amendment to the Professional Services Agreement to include additional scope that will research trenchless technologies and materials that may be advantageous for rehabilitating or replacing the Corrugated Metal Pipe Rehabilitation Program, as further described in Exhibit A; and

WHEREAS, the First Amendment was executed administratively to revise a portion of the scope of the contract regarding third party notifications; and

WHEREAS, this Second Amendment will increase the previously established contract value by $250,000 for a total not to exceed contract value of $4,500,000;

NOW THEREFORE**, in consideration of the terms, covenants, agreements and demises herein contained each to the other given, the sufficiency and receipt of which are hereby** acknowledged, the Professional Services Agreement is amended to include the following:

1. **Compensation**. The not to exceed contract sum is hereby increased by $250,000.00 for services described in Exhibit A, attached to this Second Amendment and incorporated herein by reference, for a revised not to exceed contract sum of $4,500,000.00.

Except as amended hereby, all other provisions of the Professional Services Agreement are hereby retained in their entirety and remain unchanged.

EXECUTED and **AGREED** to as of the dates indicated below.

City Of San Antonio	**RJN Group, Inc.**
_____	Dan Jackson
(Signature)	*(Signature)*
Printed Name: _____	Printed Name: Daniel Jackson
Title: _____	Title: Vice President
Date: _____	Date: 5/23/2019

Approved as to Form:

_____
Assistant City Attorney

EXHIBIT A
SCOPE OF SERVICES

February 4, 2019

Mr. Roberto Reyna
Project Development Manager – Stormwater Division
Transportation and Capital Improvements
114 W. Commerce, 6th Floor
San Antonio, TX 78205

RE: DRAFT Letter Proposal for Implementing a Corrugated Metal Pipe (CMP) Rehabilitation Program

Dear Mr. Reyna,

RJN Group, Inc. is pleased to submit this DRAFT letter proposal in response to your request for the implementation of a Corrugated Metal Pipe (CMP) Rehabilitation Program for the City of San Antonio. Based on our meeting with the City of San Antonio (COSA) Transportation and Capital Improvement (TCI) leadership on January 17, 2019, we have summarized our understanding of the project and outlined the proposed scope of services that will be provided by RJN in Attachment A.

We are excited about this opportunity to help the COSA with achieving the objectives of the corrugated metal pipe (CMP) rehabilitation program. We trust this proposal meets your requirements for this project. If, after reading through the DRAFT letter proposal, you would like to make any modifications prior to submitting a FINAL Draft, please do not hesitate to reach out to me with any changes or additions you might have.

Once again, we appreciate the opportunity to be of service to you and look forward to working with you on this important project.

Sincerely,

RJN GROUP, INC.

Noelle Gaspard, PE, CFM, GISP
Stormwater Practice Lead

Olufunso (Sylvester) Ogidan, Ph.D., PE, PG, PMP
Branch Manager

C: Nefi Garza, PE, CFM — Stormwater Assistant Director
Martin Hernandez — Interim Stormwater Operations Manager

ATTACHMENT A

Project Understanding and Scope of Services

Introduction

The City of San Antonio (COSA) has over 620 miles of stormwater infrastructure that is owned and maintained by the City. Through the ongoing stormwater sewer televising program that began in 2015, approximately 55 miles (290,400 LF) has been identified as having a material of corrugated metal pipe (CMP) based on previous inspections and the attribute information in the City's GIS layers. The amount of CMP is expected to increase as the televising program continues and previously unmapped are found or pipes that originally were attributed with a material type of "Unknown" are updated as CMP. Many of the CMP assets were installed over 50 years ago and they are at the end of their useful life. Over time, many of the inverts – if they were submerged or received a lot of stormwater drainage – actually start rusting out and deteriorate. This creates a condition in which water that is supposed to flow through the pipe infiltrates underneath the bedding and starts to erode, leading to pipe failure and the potential for unstable ground and sinkholes. The corrosion of CMP in San Antonio is exacerbated by the clay soil found throughout the City which has already resulted in structural failures at some locations.

Rehabilitation of stormsewer can be achieved using conventional open-cut methods. However, such repairs are costly because of the extreme quantities of earth that must be moved. Additionally, the cost of pavement removal, replacement operations and traffic control could make this approach cost prohibitive. This rehabilitation method can cause major social disruption as well as environmental disruption; that is when trenchless systems come in to place because while you might need a small excavation for insertion of a liner, it's going to cause less disruption that an open trench.

The purpose of this project is to research trenchless technologies and materials that may be advantageous for rehabilitating or replacing the CMP storm infrastructure throughout the City. The project is divided into two phases.

- Phase I is the planning and programming phase, which involves completion of detail study that will result in selection of four (4) trenchless rehabilitation technologies that is conducive for the conditions in the City and tailored to different site conditions. This phase also involves risk-based prioritization of CMP asset, development of trenchless technologies selection matrix, and cost estimate for the completion of the City's CMP system.
- Phase II is the completion of a pilot study in which the four methods are constructed and tested in the field in the rehabilitation of 1500 LF of CMP.

Phase I: Planning and Programming

The project goal for the Corrugated Metal Pipe (CMP) Rehabilitation Program is to evaluate different trenchless rehabilitation approaches for stormsewers and to advance four (4) of the evaluated solution alternatives from conceptual state to engineering design and rehabilitation of 1500 linear feet of

identified deficient CMP infrastructure. This approach, blends engineering expertise with analytical tools including Geographic Information System (GIS) and InfoMaster, applying Best Practices to assess a comprehensive feasibility assessment for different trenchless alternative for stormsewer rehabilitation. We will recommend four (4) alternatives based on the proper application of trenchless techniques that optimize construction while minimizing costs, risks, and impacts to the community. The objective of the planning and programming phase of the project includes:

1. Develop an algorithm to estimate the annual quantity of CMP from on-going televising program by exporting database information from GIS.
2. Prioritize the locations/segments of the CMP to be repaired.
3. Develop a matrix that identifies when/how to use each method based on criteria such as: cost, reliability, history, warranty, availability, application use, and limitations.
4. Determine the best rehabilitation method that best suits each CMP location.
5. Develop an estimated cost to repair the remaining CMP system
6. Recommend an annual program budget and required resources

Corrugated Metal Pipe (CMP) Estimate

The RJN team, led by Noelle Gaspard, P.E., CFM, GISP, has inspected over 850,000 linear feet (~160 miles) of stormsewer data during the ongoing stormwater sewer televising program from 2015-2018. They have identified over 55 miles of CMP in the city-wide network and, of that 55 miles 7.1 miles of CMP has been inspected, coded using NASSCO PACP standards and scored based on Risk of Failure using InfoMaster. We will continue to update the geodatabase with additional condition information as televising and rehabilitation continues in other areas of the City, which in turn will identify the lines for rehabilitation prioritization from the decision tree algorithm that will be developed in InfoMaster.

Prioritization of CMP for Rehabilitation

RJN has completed condition analyses on 850,000 linear feet of storm sewer in the City, including 37,550 linear feet of CMP. The condition analysis integrates the likelihood of failure (LOF) with the consequence of failure (COF) to prioritize the storm sewer for rehabilitation.

Likelihood of Failure (LOF)

InfoMaster models the aging and deterioration processes of pipes to compare their expected useful lives, failure potential, and the occurrence distribution over time.

LOF indices are assigned to each asset using parameters that can affect the likelihood of failure such as size, length, material, age, location, operating pressure, rainfall, land use, soil properties, temperature, traffic loads, seismic zone, ground water level, proximity of other underground installations and history of failure.

Consequence of Failure (COF)

The COF criteria is identified by staff, available data, and input from COSA leadership. Several different combinations were evaluated to develop the optimum risk profile. COF parameters honor the “triple

bottom line" of sustainable solutions that seek to attain value and maximize environmental protection, social responsibility, and economic success.

- Consequence of Failure (COF) Indices—Considers physical, asset performance, social and environmental impacts that could result from an asset failure
- COF Modeled Parameters—Pipe attributes, population, proximity to critical facilities, high traffic zones, disruption to businesses and residents, environmentally sensitive areas, waterways, pavement, etc.

By associating the parameters for COF and LOF, each asset receives a score defining its potential risk. This risk profile is used to screen and group defects and leads to a prioritization of assets with highest to lowest risk of failure.

Assessing Risk

InfoMaster integrates the two key components of risk analysis for each pipe and structure asset in the sewer system:

- Likelihood of failure (LOF)
- Consequence of failure (COF)

Assessing the LOF against the COF, allows us to prioritized the risk of failure for each asset from highest to lowest. The Risk Analysis derives a ranking for each asset by weighing the probability that it will fail and, if so, assess how significant the impact will be. This provides a means to:

- Pinpoint assets with the greatest risk of failure
- Identify the best possible improvement alternatives for optimal system performance,
- Prioritize and phase improvements based on available budget
- Realize significant cost savings

Trenchless Rehabilitation Methods

A critical step in the CMP Rehabilitation Project is the selection of the most appropriate, cost effective, and reliable method for rehabilitation. RJN will review and evaluate different trenchless rehabilitation methods with the potential to successfully replace or rehabilitate the CMP pipes. A comprehensive literature search will be conducted from sources to include: articles, reports, memorandums, and other material from a variety of sources, including the U. S. Army Corps of Engineers, state departments of transportation, universities, American Society of Civil Engineers, Federal Highway Administration, American Association of State Highway and Transportation Officials, American Society for Testing and Materials, and private consultants. The review will include but not limited to the technologies highlighted in

Table 1 on the following page.

***Table 1**: Example of trenchless technology that will be reviewed in the planning phase of project*

Method	Recommended Diameter Range (in)	Recommended Maximum Installation (ft)	Material
Cured-in-place pipe (CIPP)			
• Inverted in place	4—108	3000	Thermoset resin/fabric composite
• Winched in place	4—100	1500	Thermoset resin/fabric composite
Underground coatings and linings (UCL)	3—180	1000	Epoxy, polyester, silicon, vinyl ester, polyurethane, and cementitious materials
Sliplining (SL)			
• Segmental	24—160	1000	PE, PP, PVC, GRP
• Continuous	4—63	1000	PE, PP, PE/EPDM
Modified sliplining (MSL)			
• Panel lining	>48	Varies	GRP
• Spiral wound	6—108	1000	PE, PVC, PP, PVDM
• Formed-in-place	8—144	Varies	PVC, HDPE
In-line replacement (ILR)			
• Pipe bursting	4—48	1500	PE, PP, PVC, GRP
• Pipe removal	<36	300	PE, PVC, PP, GRP
• Pipe insertion	<24	500	Clay, ductile iron
Close-fit pipe (CFP)			
• Close-fit pipe structural	3—24	1000	HDPE, MDPE
• Close-fit pipe nonstructural	3—63	1000	HDPE, MDPE
Thermoformed pipe (ThP)	4—30	1500	HDPE, PVC
Lateral renewal	4—8	100	Any

*Note: **PE** = Polyethylene, **PP** = polypropylene, **PVC** = polyvinyl chloride, **GRP** = glass reinforced polyester, **EPDM** = ethylene-propylene diene, **HDPE** = high-density polyethylene, **MDPE** = medium-density polyethylene*

Method Selection for Pilot Study

Four methods will be selected from the evaluated methods for the pilot project. Each method will be evaluated for cost, reliability, history, warranty, availability, application use, environmental impact and limitation. We will review industry and technical journals to identify the best available trenchless technologies for CMP. Additionally, we will consult with other municipalities that have implemented technologies in sewer or stormwater system rehabilitation to elucidate lessons learned and technologies that have been proven to be successful in different applications.

RJN is aware that San Antonio Water System (SAWS) is a key resource for identification of trenchless technology specific to the City of San Antonio. SAWS has been under a consent decree for sewer system rehabilitation since 2013. They have explored different rehabilitation techniques under the program. RJN project manager, Dr. Sylvester Ogidan, Ph.D., P.E., P.G., PMP will consult with SAWS to better understand trenchless technologies that have been tested in the sewer rehabilitation program and evaluate approaches that can be adapted to CMP stormwater infrastructure rehabilitation while optimizing cost of storm sewer rehab compared to sanitary sewer rehab.

Material Selection

Pipe material evaluation for the CMP rehabilitation program will focus on materials that are typically used in corrosive clays and shifty soils that are typical in San Antonio and are cost competitive for stormsewer application. RJN will enlist the expertise of researchers at University of Texas at San Antonio (UTSA) to determine the material for each evaluated method that is conducive for the CMP rehabilitation. The material selection criteria will be based on maximizing reliability, service life, and structural integrity of the improved CMP while minimizing cost. Other soil characteristic that will be considered include:

- Moisture content
- Compatibility
- Soil Classification
- Stability
- Organic contaminants
- pH
- Sulphate (total as SO_3)
- Subsidence
- Soil resistivity

Pilot Study Site Selection

CMP rehabilitation prioritization will be achieved using the InfoWorks Decision Tree Analyses. This tool analyzes a set of predefined criteria applied to each asset in order to determine the optimal remedial measure for each asset. RJN utilize the NASSCO PACP coding on a scale of 1–5. A rating of 5 indicate that the line is in a complete state of disrepair. The established “decision tree” criteria are used by InfoMaster to create algorithms that assign each asset an initial rehabilitation plan. InfoMaster easily tracks, reviews, analyzes and validates any number of scenarios to instantly compare different remedial strategies and derive and prioritize the alternatives. By using risk-based analyses on each defect, each asset can be “categorized” in accordance with the preestablished requirements.

Site Breakdown

Four (4) noncontiguous lines ranging from 300 to 400 LF each will be selected for the pilot study. The selected technologies and material combinations will be executed at each of the site.

Estimated Budget to Repair the Remaining CMP System

Once the four selected technologies have been approved by COSA leadership, RJN will utilize AACE International Class 3 construction cost to estimate the cost of completing the rehabilitation of the remaining CMP system. The construction costs will be converted into capital costs by applying soft costs, project contingencies, and market fluctuations to each individual cost component.

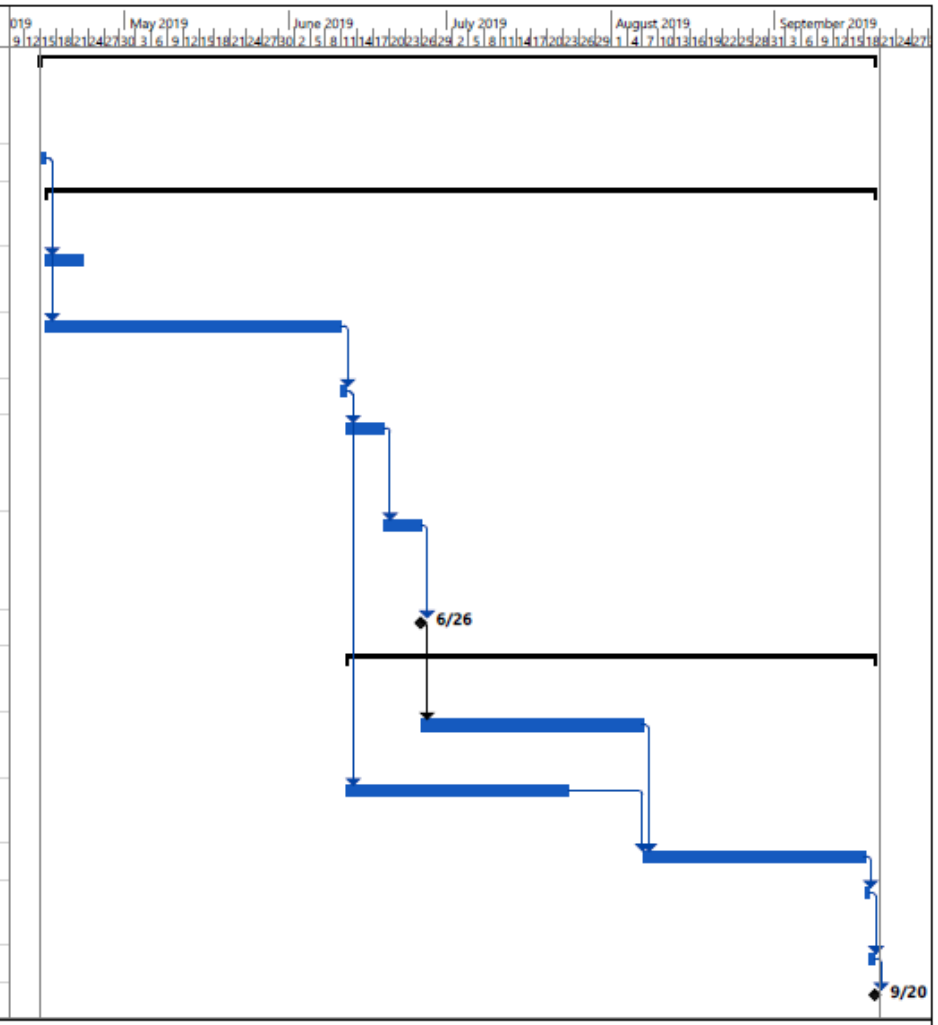
Phase II: Pilot Study

RJN will select a total of 1500 LF of the high priority CMP for rehabilitation pilot study. One to four trenchless construction companies will be selected to complete the work. We will prioritize firms with experience performing similar construction in the City for this phase of the project.

Project Schedule

A planning level schedule for the project is shown on the following page. The schedule originates from the overall program schedule; therefore, gaps in specific activity may occur.

ID	Task Name	Duration	Start	Finish
1	**FY19 Corrugated Metal Pipe (CMP) Pilot Program Storm Water Engineering**	**114 days**	**Mon 4/15/19**	**Fri 9/20/19**
2	Notice to proceed	1 day	Mon 4/15/19	Mon 4/15/19
3	**Phase I: Planning and Programming**	**113 days**	**Tue 4/16/19**	**Fri 9/20/19**
4	Estimate annual quantity of CMP	5 days	Tue 4/16/19	Mon 4/22/19
5	Research technologies and materials	40 days	Tue 4/16/19	Mon 6/10/19
6	Study Update to CoSA	1 day	Tue 6/11/19	Tue 6/11/19
7	Develop cost estimate to repair remaining CMP system	5 days	Wed 6/12/19	Tue 6/18/19
8	Develop annual program budget and required resources	5 days	Wed 6/19/19	Tue 6/25/19
9	Submit report to CoSA	0 days	Wed 6/26/19	Wed 6/26/19
10	**Phase II: Rehabilitate 1,500 LF of CMP**	**72 days**	**Wed 6/12/19**	**Thu 9/19/19**
11	Design rehabilitation for 4 locations	30 days	Wed 6/26/19	Tue 8/6/19
12	Construction subcontracting	30 days	Wed 6/12/19	Tue 7/23/19
13	Construction	30 days	Wed 8/7/19	Tue 9/17/19
14	Site inspection by CoSA	1 day	Wed 9/18/19	Wed 9/18/19
15	Submit Final Report	1 day	Thu 9/19/19	Thu 9/19/19
16	Project Complete	0 days	Fri 9/20/19	Fri 9/20/19



Project: schedule.mpp
Date: Tue 1/29/19

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

Page 1

Request for Quote (RFQ) Development and Program Management

At the end of the project, RJN will assist the COSA to develop the RFQ for the CMP rehabilitation program. The RFQ will spell out the specifications and requirements for contractors that will be used in the rehabilitation program. RJN will assist the City in the bidding and selection process. RJN will also continue to serve as the program manager and continue to ensure the successful execution of the CMP rehabilitation program.

Project Cost

RJN will ensure that the total cost of completing Phases I and II of this project will not exceed $1,000,000. We will work with the COSA contracting department to get this project set up with whatever contracting mechanism the City desires.