CITY OF OREGON CITY
Amendment No. 2 to Personal Services Agreement

Sanitary Sewer Master Plan Update (CI 11-013)

This is an Amendment to the Personal Services Agreement by and between the City of Oregon City (hereinafter City), and **Brown and Caldwell, Inc.**, hereinafter called "PS Contractor," which was previously entered into on October 25, 2011 ("Contract") for **Sanitary Sewer Master Plan Pre-Planning Services;** and

Whereas, the parties wish to amend the Contract as set forth below:

WITNESSETH

1. The **Scope of Work** is hereby amended as follows:

   For provision of hydrologic/hydraulic water development services, lift station assessment, and master plan document preparation necessary to update the existing Sanitary Sewer Master Plan and as more specifically detailed in Exhibit A, attached.

2. The **Duration of Contract** is hereby amended as follows:

   The contract expiration date shall be extended from **June 30, 2012** until **June 30, 2013**.

3. The **Payment Provisions** are hereby amended as follows:

   For provision of additional services described above, the contract price shall be increased by an amount not to exceed **one hundred fifty-one thousand seven hundred ninety-two and 00/100 dollars ($151,792.00).** The total not to exceed amount of the Agremeent shall be **two hundred forty thousand two hundred eighty-nine and 00/100 dollars ($240,289.00).**

All other provisions of the Personal Services Agreement referenced above shall remain in full force and effect.

BROWN AND CALDWELL, INC.

By:_____

Name:_____

Title: _____

Date: _____

CITY OF OREGON CITY

By: _____
David W. Frasher
City Manager

DATED: _____, 2012.

Date Originally Authorized by Commission: January 4, 2012.

By: _____
John M. Lewis, P.E.
Interim Public Works Director

APPROVED AS TO LEGAL SUFFICIENCY:

By: _____
City Attorney

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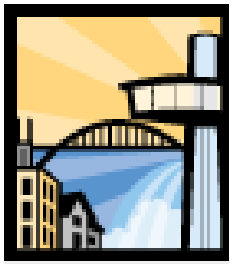

City of Oregon City

Sanitary Sewer Master Plan
Scope of Work

This Scope of Work builds on the work completed to date in preparation for a comprehensive Sanitary Sewer Master Plan (SSMP). Work completed includes monitoring of wet weather flows (January through March 2012) and selection of a hydrologic/hydraulic model.

Task 1. Project Management

Brown and Caldwell (BC) will establish internal project controls to monitor project status, budget, and schedule on an on-going basis. BC will prepare monthly status reports that will be submitted with the monthly invoices to the City.

BC will perform internal quality assurance and quality control (QA/QC) activities on all project deliverables and perform checks of engineering calculations, development of the model inputs, and cost estimates. QA/QC staff will consist of senior-level engineers experienced in sewer system planning, design, and construction who are not otherwise involved in day-to-day project activities. QA/QC activities and effort are included in each of the specific tasks.

Task 2. Physical Data Collection

Task 2.1. Prepare Flow and Rainfall Data

BC will prepare the flow and rain data collected during the January through March 2012 flow monitoring project for use in the modeling.

- Flow data collected during the January through March 2012 flow monitoring project will be prepared for incorporation into the model.
- Rain gauge data collected during the January through March 2012 flow monitoring project will be prepared for input into the model.
- Historic rain gauge data will be purchased from the National Oceanographic and Atmospheric Administration for development of rainfall-derived inflow and infiltration (RDII) flow projections.

Task 2.2. Collect Missing Physical Data

BC has developed preliminary model extents for model development. As currently planned, the model would include 643 manholes and 677 pipes. The following is a summary of the extent of data missing from the City geographic information system (GIS) files that must be collected and input into GIS.

- Of the 643 manholes, 259 are missing rim elevations
- Of all the manholes, 101 are missing invert elevation data
- Nine of the 677 pipes are missing diameter data

BC staff will review the information and provide a high-level QA review.

EXHIBIT A

Assumptions: The following assumptions were used to develop the scope and budget for this project.

- City staff will collect and tabulate the required missing information for the above facilities.
- GIS files of parcel and street base mapping and associated parcel data will be provided by the City. GIS files of current and future land use mapping and/or zoning will be provided by the City.
- Winter water use data is to be provided by the City in GIS format or other format easily correlated to existing parcel data. BC will convert it to sub-basin flows for input to the model.
- City will provide 5-minute flow data or run-time data from lift stations in electronic format. Run-time data should include on and off times and be accompanied by estimates of lift station flow rates or pump curves.
- City staff will collect and tabulate the missing facility information identified above.

Task 3. Hydrologic/Hydraulic Model Development

Task 3.1. Construct Hydrologic/Hydraulic Model

BC will utilize the InfoSWMM hydrologic/hydraulic model software produced by Innovyze as recommended at the sewer model meeting held with City staff. Data gathered in Task 2 will be imported to the modeling software. The existing system facilities in the model will be reviewed with City staff and compared to record drawings to identify changes to physical facilities. Manholes will be numbered to match City GIS data.

Task 3.2. Delineate Sub-basins and Develop Flows

BC will delineate sewer sub-basins, with each sub-basin representing a flow to a modeled manhole. The flow from each sub-basin will be determined as follows.

- **Existing Unit Flow and Base Flow Rates**
  This data will be developed on a parcel basis by assigning parameters to each parcel that can be used to calculate its wastewater base flow (e.g., number and type of dwelling units, square footage of building space, and/or actual winter water use). For this proposal, BC assumes that winter water use data, land use mapping, and/or parcel billing information are available. If they are not available, base flow will be determined from flow metering data. The flow metering data will also be used to develop existing diurnal patterns.

  In addition, BC will develop flows for any significant point source dischargers based on records available from the City.

- **Future (Build-Out) Unit Flow and Base Flow Rates**
  Sub-basin base wastewater flows will be developed for the future (build-out) condition. BC will meet or conduct telephone interviews with the City's planning staff as necessary to identify specific areas of projected new development within a single planning horizon defined by the City. Future unit flow rates and diurnal patterns will be developed by land use type and based on comparable existing land use areas.

- **Existing and Future Groundwater and RDII Flow Rates**
  Existing groundwater and RDII flows will be modeled using the following method.

  1. Infiltration from groundwater will be modeled by running a long-term rainfall series through a Hydrological Simulation Program-FORTRAN program. The program will use regional parameters to develop an area-based unit flow. The existing unit flows will be scaled to match the flow monitoring data at each of the 16 flow monitoring sites and input to the InfoSWMM model as a flow time-series.
  2. Inflow from direct runoff sources will be estimated using features within the InfoSWMM model.

  Future RDII flows from collection system expansion will be estimated based on flows measured from areas of similar existing land use and age.

Task 3.3. Calibrate Model

The flow monitoring data will be used to verify the calibration of the model and adjust flow parameters as necessary. The model will be calibrated for both dry and wet weather conditions. Calibration involves comparing modeled flows to actual observed flows from the flow monitoring data. Corrections will be made to the model to achieve a reasonable match to the observed flows. Corrections include adjusting roughness values, infiltration, and resolving connectivity and pipe slope issues. The model will be calibrated first for dry weather conditions and then to observed (monitored) wet weather events.

Task 4. Collection System Hydraulic Evaluation

Task 4.1. Develop Evaluation Criteria

BC will develop criteria for analyzing collection system capacity. The design/evaluation criteria will be documented in a draft chapter of the SSMP and submitted to the City for approval. The write-up will recommend performance criteria for evaluating system capacity and design criteria used to size proposed sewer facilities. The criteria will include an allowable or design flow-depth-to-diameter ratio or allowable surcharge, minimum flow velocities and pipe slopes, and appropriate Manning's "n" values. The City's existing design standards will be considered in the development of performance evaluation and design criteria, and proposed criteria will be discussed with the City before use in the system evaluation.

Task 4.2. Develop Design Storms

The selection of design storms will be conducted with a simplified model that provides rapid simulation of the entire rainfall record to determine peak flows from statistical analysis. Peak RDII flows generated from a storm depend on antecedent moisture conditions and the timing of rainfall. There may be periods of the rainfall record where back-to-back small storms produce peaks greater than that resulting from the Department of Environmental Quality (DEQ) 5-year precipitation event. BC has observed cases where the DEQ storm overestimates the 5-year peak flow as determined from long-term simulation. Thus, it is important for the City to understand how the DEQ event fits within the actual expected conditions in order to make the best decisions on capacity compliance.

BC will determine the 1-in-5-year and 1-in-10-year wet season, 24-hour flow events. Additional design storm criteria such as the 1-in-5-year, wet season, 24-hour rainfall event and the 1-in-10-year, dry season, 24-hour flow event for this analysis will also be determined as required by DEQ.

Task 4.3. Capacity Analysis

BC will conduct eight model runs using each of the four design events for existing and future build-out conditions to identify capacity deficiencies under peak dry weather flows and design peak wet weather flows. BC will analyze the model results based on the design flow criteria and will determine the apparent causes of capacity deficiencies.

Task 5. Capital Improvements Identification

Task 5.1. Analyze Required Existing Sewer Improvements

Based on the design event selected in Task 4.2, the model will be used to evaluate required pipe sizes for passing flows from the existing sanitary collection system planning horizon. Tables and figures will be prepared showing the recommended improvements along with their costs.

Task 5.2. Analyze Required Future Sewer Improvements

The model will be used to evaluate required pipe sizes for passing flows from the future sanitary collection system planning horizon for each of the four design events. Tables and figures will be prepared showing the recommended improvements along with their costs. Based on this analysis, BC will recommend that the City adopt one design event as the basis for developing the capital improvement program considering cost of improvements and level of protection provided against sanitary sewer overflows.

Task 5.3. Develop and Analyze Alternatives

For the selected design event and the future planning horizon, BC will develop and analyze additional potential solutions to the identified capacity deficiencies. Solutions may include flow diversions and construction of parallel relief sewers, infiltration/inflow reduction through sewer rehabilitation, and the replacement of existing sewers with larger pipes. Solutions will be developed and verified by adding the proposed facilities to the model. Locations of improvements, including alignments and pipe sizes, will be discussed with City staff. Detailed design and items such as right-of-way issues, utility conflicts, etc., will not be investigated for this project.

Task 6. Lift Station Assessment

Task 6.1. Lift Station Assessment

BC will validate lift station attributes at the 13 City lift stations for inclusion in the SSMP. We will provide a simple site review of the lift stations to identify data gaps or inconsistencies in the known physical data. Based on the hydraulic assessment, BC will indicate any need for future expansion of the lift stations. The findings and recommendations will be documented in the SSMP.

Task 7. SSMP Document Preparation

Task 7.1. Develop SSMP Table of Contents

BC will prepare a draft SSMP table of contents that identifies all chapters, figures, maps, and appendices to be included in the document. The table of contents will be discussed with City staff and modified to meet the City's needs. The table of contents shown in Attachment A is assumed to be part of the first draft of the SSMP and is used as the basis for estimating the cost of preparing the SSMP.

Task 7.2. Draft SSMP

BC will prepare a draft SSMP including all chapters, figures, maps, and appendices to be included in the document. One copy of the draft SSMP will be provided to the City for review and comment.

Task 7.3. Final SSMP

BC will prepare the final SSMP including all chapters, figures, maps, and appendices to be included in the document. One camera-ready copy of the SSMP will be prepared and submitted to the City. In addition, an electronic version of the SSMP will be prepared in PDF format using Adobe Acrobat. Chapters, subchapters, figures, and maps will be linked to the table of contents for ease of use and access.

Task 8. City and Public Meetings

Task 8.1. City Team Meetings

BC will participate in the following meetings with City staff during preparation of the SSMP:

- hydraulic model development: three meetings
- modeling results (flows and selection of design event): one meeting
- recommended capital improvement projects: one meeting
- SSMP table of contents: one meeting
- Draft SSMP review comments: one meeting

Task 8.2. Public Meetings

BC will participate in the following public meetings during preparation of the SSMP:

- public meetings: two
- council meeting: one

City of Oregon City
Sanitary Sewer Master Plan
Budget

08/13/12

Oregon City, City of (OR) -- Oregon City SS Master Plan							
Phase	Phase Description	Total Labor Hours	Total Labor Effort	APC	Total Expense Cost	Total Expense Effort	Total Effort
100	**Project Management**	**35**	**5,491**	**280**	**0**	**280**	**5,771**
200	**Physical Data Collection**	**96**	**9,645**	**768**	**200**	**968**	**10,613**
300	**Develop Hydraulic Model**	**284**	**31,893**	**2,272**	**0**	**2,272**	**34,165**
400	**System Evaluation**	**143**	**17,867**	**1,144**	**0**	**1,144**	**19,011**
500	**Identify Capital Improvements**	**184**	**19,568**	**1,472**	**0**	**1,472**	**21,040**
600	**Lift Station Assessment**	**56**	**5,673**	**448**	**0**	**448**	**6,121**
700	**Prepare SSMP Document**	**348**	**38,514**	**2,784**	**1,500**	**4,284**	**42,798**
800	**City and Public Meetings**	**80**	**11,033**	**640**	**600**	**1,240**	**12,273**
	GRAND TOTAL	**1,226**	**139,684**	**9,808**	**2,300**	**12,108**	**151,792**