CLAYTON COUNTY WATER AUTHORITY

Request for Proposal

JDE 9.2 UPGRADE

Proposal Number: 2017-IT-10

Proposal Opening: Wednesday, August 9, 2017 at 2:00 p.m. (local time)
1600 Battle Creek Road, Morrow, GA 30260

**Non-Mandatory Pre-Proposal
Conference Call:** Tuesday, July 18, 2017 at 2:00 p.m. (local time)

A D D E N D U M # 1

Dated: July 21, 2017

> *Acknowledgment of receipt of this addendum **MUST BE SIGNED AND INCLUDED IN YOUR RESPONSE TO THE RFB.***

QUESTIONS:

1. **In Section 2.5 F, items 3 & 4 states that references must include a customer in the Utilities Industry. If responders do not have this requirement, will they be immediately disqualified, or will it just affect the points given under the reference criteria section in the evaluation process?**

    Answer: We have a preference for the Utilities industry, however, this will not disqualify a proposer from being considered.

2. **Will CCWA be on Windows 2012 & SQL 2016 versions prior to the upgrade, or will these server and database upgrades need to be included in the scope of work?**

    Answer: CCWA will have version 9.2.1, tools 9.2.1.4, and will utilize Windows 2016 and SQL 2016 for the terst environments. We would expect proposer to be responsible for setup of Production environment at the appropriate time during the upgrade, with the decided on version/tools release/operating system/database that is agreed on.

3. **Can CCWA provide a list of all modified and custom objects?**

    Answer: CCWA is researching this information and will provide a list in a future addendum.

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4. **We currently do not fall under SLBE category. Is it mandatory that respondents need to be CCWA Certified SLBE? Whether this is mandatory? And if not, do we still need to fill in the SBLE forms?**

   <u>Answer:</u> Participation in the SLBE program is not a requirement for submitting a proposal to CCWA. SLBE participation is a requirement when preference points are to be sought only. The Proposer will be required to complete the required forms as outlined in Division 2, Section 8 of the RFP package. If a form does not apply to the Proposer, the form must be completed with an indication of "N/A" ("Not Applicable").

5. **"Bids for public works whose price exceeds $100,000.00 must be accompanied by a certified check, cashier's check, or acceptable bid bond in an amount not less than five percent (5%) of the amount bid". Is this a mandatory requirement (for submission with the proposal? How does county wishes to utilize the Bid Bond in the process ahead?**

   <u>Answer:</u> Georgia Bid Bond, Performance, and/or Payment Bonds are not required with this procurement.

6. **Customer References- We have completed multiple, distributed locations- JD Edwards projects (Implementation and Upgrades) Our vertical expertise for these projects include manufacturing/ construction / Distribution / Oil and GAS / Food and Beverages etc... While these do not fall under Utility Industry, we hope that this will not restrict us from submitting our response to this upgrade- Please confirm.**

   <u>Answer:</u> Please refer to answer provided on number 1 above.

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7. **Would county be open for an onsite- offshore delivery model for upgrade project? (Referring to the 70% staff requirement).**

    <u>Answer:</u>   CCWA is open to this, as long as it complies with the stated 70% requirement of tasks being assigned to personnel physically located in North America as listed in the RFP.

8. **Would you be open to consider onshore-offshore staff model? I.e. Some consultants operating from county site where as others supporting them from offshore location? If yes, will it be okay if the offshore team is located outside US?**

    <u>Answer:</u> Please refer to answer provided on number 7 above.

9. **If not and you are looking for only onshore model, will you accept resources landed (Skilled resources coming from other countries with valid with VISA/ Green card) or only US citizens?**

    <u>Answer:</u>   We are fine with landed resources subject to the review/approval requirements we have listed.

10. **Can you please provide any current design specs or requirements documents that have been developed for the interfacing between CityWorks and JD Edwards?**

    <u>Answer:</u> See attached document related to Cityworks interface.

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11. **Can you please provide a comprehensive list of all existing JDE 9.0 customizations and enhancements?**

    Answer: Please refer to answer provided on number 3 above.

12. **Will the upgraded version for the project be JDE 9.2 or JDE 9.2.1?**

    Answer: 9.2.1or higher, tools 9.2.1.4 or higher (depending on when project starts and what is available at that time).

_____
SIGNATURE   COMPANY NAME

_____
DATE

Oracle / JD Edwards JDE/city works work order interface

JD Edwards E9.0

Design Document

FOR THE Clayton County Water Authority

Last Revised Date
06/8/2015

Prepared By:

Troi eisler/Adam Grunys/Vance Musgrove

iSP^3 *solution providers inc.*

REVISIONS AND APPROVALS

REVISION	DATE	UPDATED BY	COMMENTS
001	5/25/15	AG, TE, VM	
002	6/8/15	TE	Update details regarding how Costs and Errors will be recorded
003			

NAME OF APPROVER	DATE	SIGNATURE

This document outlines requirements identified during the Scope and Design Workshops for JDE E1 to Cityworks work order integration held on site at the Clayton County Water Authority from Tuesday May 12, 2015 through to Thursday May 14, 2015. This document will evolve during the JDE E1 9.0 City Works/JDE work order integration implementation activities. The attendees for the majority of the meetings were:

1. Dan H   CCWA
2. Allison Halron   CCWA
3. Angie Bennett   CCWA
4. Bryan St. Mary   CCWA
5. Stacey Doerr   CCWA
6. Kelly Taylor   CCWA
7. Kelly McDougal   CCWA
8. Beth Thompson   CCWA
9. Andrea Stallworth CCWA
10. Karen Riser   CCWA
11. Keith Watkins   CCWA
12. Maureen Miller   CCWA
13. Marcus McLester   CCWA
14. Kevin Osbey   CCWA
15. Joey Martin   CCWA
16. Troi Eisler   iSP3
17. Vance Musgrove   iSP3
18. Adam Grunys   iSP3

CCWA is currently live on JDE E1 9.0 release 2 (Tools release 8.98.4.3) and is using the following modules in some capacity:

1. Financials (AP, AR & GL)
2. Address Book
3. HR/Payroll
4. Purchasing
5. Inventory Management
6. Equipment Maintenance
7. Work orders
8. Equipment Billing

The team discussed about taking hours entered against a work order as estimate hours being pulled from Cityworks and create a JDE Journal Entry. When this Journal Entry is successfully posted, the corresponding equipment costs (based on hours used) would be applied back to the Cityworks work order as actual equipment costs. Any further process to bill based on the actual costs is a standard JDE process and doesn't have anything to do with the interface in scope.

-

Objectives

- The key goal is to build a work order integration between JDE and Cityworks. This integration was only to include linear assets and for the Storm water and D&C departments.
  - o The integration must be designed and built such that both Cityworks and JDE can function in the absence of the other system
  - o The integration must be designed in a way that minimizes the impact on both JDE and Cityworks to make upgrades of both systems as easy as possible.
  - o For the identified interface touch points changes to the state (data) in either system must be synchronized either immediately, if both systems are available, or once both systems are available.
  - o To increase the accuracy of costs and associated data by minimizing data entry points, promote efficiency by not having duplicate data entry
  - o Have true costs updated from JDE to Cityworks
  - o Have both capital and maintenance work orders integrated between JDE and Cityworks
  - o Have the ability to expand to support future integrations (Publish/subscribe not PTP)

Business Rules

GENERAL

The following rules are deemed critical for the client:

- All capital work orders are required to have a smart number created initially in JDE and replicated in Cityworks by the interface

- Maintenance work orders will be created initially in Cityworks using a sequential number and replicated in JDE by the interface

- JDE will be the master for all inventory (material) data

- JDE will be the master for all financial data

- JDE will be the master for payroll and HR data

- JDE will be the master for address book type data (i.e. vendor, employee)

- JDE will be the master for equipment (assets) data

- When an employee's time is being charged to a maintenance work order, the employee's time must be charged to the employee's home BU and not to the work order's BU.

- When an employee's time is being charged to a capital work order, the employee's time must be directed to the work orders BU and not to the employee's home BU.

- All processes must follow standard JDE business rules

- The data entry for employee and equipment time will be entered into Cityworks in estimate fields only.

- Employee Time (hours) entered against a work order are to be brought over to payroll to minimize time entry in payroll.
  - **The "pull" of this employee time will be initiated by appropriate time keeper**
  - **The employee time will be for actual time worked on a work order and will not include time such as sick, vacation,**

training, etc, nor time not worked against a Cityworks work order.

- Equipment Time (hours) entered against a work order are to be brought over as a journal entry on a schedule to be determined by CCWA
    - We will need to determine a mechanism to ensure that we retrieve equipment usage hours against a work order (entered as estimate values). This mechanism must ensure that we do not duplicate equipment hours.
    - This is actual hours the equipment is to be charge against a work order, not meter reading hours, and will be written as a JDE Journal Entry Batch. Successfully posting this batch will initiate the transfer of actual equipment costs back to the Cityworks work order.
    - Data entry of any actual costs will be disabled in Cityworks to ensure that all actual costs come from JDE

INterface description

The integration is focused on allowing work order information common to JDE and Cityworks to be passed between the two systems. Key points about this integration are as follows:

- There are currently two work order types that will be included in this integration, capital work order and maintenance work orders.

- All maintenance work orders will be initially created in Cityworks and integrated into JDE using the same work order number.

- Capital work orders will be created in JDE and integrated into Cityworks as a Cityworks project with the same number as the JDE number and an associated Cityworks work order (using next number).
  - The work order will include the associated parts list from the JDE work orders, if one exists.

CCWA will be able to create other work orders in Cityworks to breakdown and organize different aspects contained in the capital project. Each of these work orders must have the Cityworks Project associated as the parent of these work orders. We are addressing this by modifying the P31113 program because we cannot change the AAI due to their setup of using different objects for the same item.

- **Maintenance Work Order Creation**
  - Cityworks will have the following JDE supporting data when creating a Cityworks maintenance work order:
    - BU (associated with WO template in CW)
    - Branch/plant
    - Status (synch with CW)
    - Type (corrective WO, maintenance WO, capital WO, etc.) - may directly relate to WO template in CW
    - Address book (vendors/contractors, customer, employees - labor/originator/assigned to)
  - Once the maintenance work order in Cityworks has been created and the status of the work order has been moved to a predefined status, a process will be triggered to allow the integration of the work into JDE. This

is necessary so that, if a work order is not successfully created in JDE (there is an error preventing JDE from creating the work order), the work order status in Cityworks can be set to indicate this. Also, once the error has been corrected in Cityworks, the status can be moved forward and the integration interface signaled to try creating the work order again in JDE.

- ○ Each maintenance work order created in Cityworks will create a work order in JDE with the:
  - ▪ Corresponding work order number
  - ▪ Business unit
  - ▪ Originator
  - ▪ Assign to
  - ▪ Description
  - ▪ Parent/child relationship (if one exists in Cityworks)
  - ▪ Parts List (if one exists in Cityworks)

- **Capital Work Orders Creation**
  - ○ Initially, capital work orders will be created in JDE with a non-postable BU. Once the status of a work order is changed to a predefined status and the BU has been change to one that will allow posting, it will be integrated into Cityworks.
  - ○ Each capital work order created in Cityworks work orders will have:
    - ▪ We are told that we cannot create work orders in Cityworks with a specific number. However, we can create a specific project. Therefore we will create a project in CW that equates to the JDE Capital WO under which CW work orders will be created with CW sequential numbers each associated with the parent project. Under the parent project the interface will create an initial work order to which the associated parts list on the JDE capital work order will be attached.
    - ▪ BU
    - ▪ Originator
    - ▪ Assigned to
    - ▪ WO status (synch with JDE)

  - ○ Any new Cityworks work order created as children under the main capital work order will be maintained in JDE as children as well. The child JDE work order created will have the same supporting data as the

maintenance work order, with the exception of the BU, will be generated from the Cityworks parent work order and not the Cityworks template.

   ○ CCWA is currently using a smart work order number to assist the warehouse personnel to identify a capital work. With the integration a mod will be required to allow the warehouse personnel to only use one version of P31113 but still have the same functionality. **Medium Modification Complexity with no BSFN changes.**

- **Work Order Cost Update** - *Capital and Maintenance Work Orders*
   ○ For both, capital and maintenance work orders, cost will be applied to the corresponding work orders in Cityworks when the journal entry they are associated with in JDE, is successfully posted. The following costs will be updated to the Cityworks work order actual table:
      ▪ Labor actual cost
      ▪ Inventory actual cost
      ▪ Equipment actual cost
      ▪ The above will be further broken down by internal and external costs (if CCWA defines object accounts for this).

- **Work order update**
   ○ When a work order is updated in Cityworks, a database trigger will fire. This trigger will provide needed data to an intermediary table in the custom database schema to inform the integration of the needed action. The integration will poll this table and, when a notification is received, it will gather any needed data and provide any required translations and calls from the standard JDE logic.   The standard JDE logic will validate the information and, if the request is valid, update the corresponding work order in JDE. If the information is not valid, an error message will be reported back to Cityworks in an error table **(please see the section on Error Handling later in this document)** The following information will be used by the integration to update the work order information:
      ▪ Work order number (cannot change)
      ▪ Assigned to

- **Work order status (translated)**

- The status of a work order can mean different things in different systems. To maintain the semantics of the work order status a translation between related statuses must be setup and maintained such that, when a status changes in either system, the corresponding status is set in the other system is for that work order. This translation will be maintained in a UDC table such that the client (CCWA) can update and maintain the status relationships as their business changes and grows. If a status translation is not found in the translation table the status update will be ignored by the interface.

INTERFACE REQUIREMENTS (high level)

- Business Units: JDE master, Cityworks slave

- Employees: JDE master, Cityworks slave

- Branch Plant: JDE master, Cityworks slave

- Equipment: JDE master, Cityworks slave

- Inventory/Materials: JDE master, Cityworks slave

- Capital work orders:
    - During creation: JDE master, Cityworks slave
    - During updates: Cityworks and JDE will be both master and slave for the following data:
        - Work order status
        - Assigned to

- Maintenance work orders:
    - During creation: Cityworks master, JDE slave
    - During updates: Cityworks and JDE will be both master and slave for the following data:
        - Work order status
        - Assigned to
    - Work order costs: JDE master, Cityworks slave

- Modify GL Post to send successful post notification for all journal entries.

    - **This is a relatively small modification. JDE already is setup to publish an event on the successful post of a Journal Entry. However it is conditioned (if statement) to only create this event for Treasury type batches. We will remove the condition to allow the JDE Post program to publish this event on any GL batch that is successfully posted (ie AP, Inventory, Payroll, etc).**

- A custom schema and intermediary tables for notification of events in Cityworks.

- Error detection and handling. **Please see the section later in this document on error handling.**

- Technical integration documentation

- Work order status must be able to change the status of a work order status in either Cityworks or JDE and the corresponding status updated in the other system to match.

- Selected business units will need to be maintained by the integration interface to Cityworks to ensure that work orders are only created against valid business units.

- Selected employees will need to be maintained in the system by the integration interface to Cityworks, to ensure that work orders are only created with a valid originating employee.

- CCWA will define two ranges of work orders – one for Cityworks and another (non-overlapping), for work orders created in JDE. These ranges must be large enough and far enough apart that they will not overlap, for the foreseeable future, or before a new range can be created or defined by archived and removing old work orders

- JDE will be configured to generate real time event (RTE) notifications, for specific changes in data that we are interested in having transferred with Cityworks. The integration will be configured to listen for these events and gather any additional required data from JDE and write the data to Cityworks.

  o Business Unit Updates
    ▪ JDE will be configured to generate a standard JDE event each time a business unit is saved. The integration will gather any additional required data and then, update or insert the corresponding business unit in Cityworks.

  o Address Book Updates
    ▪ JDE will be configured to generate a standard JDE event, each time an address book record is saved. The integration will gather any additional required data from JDE and update or insert the corresponding employee in the EMPLOYEE Cityworks table.

- o Branch Plant Updates
  - ▪ JDE will be configured to generate a standard event, each time a Branch Plant record is saved. The integration will gather any additional required data from JDE and update or insert the corresponding Branch Plant into Cityworks.

- o Inventory Updates
  - ▪ JDE will be configured to generate the standard JDE Inventory update events each time an inventory item is updated. The integration will gather the required additional required data from JDE and update or insert the corresponding inventory item in the INVENTORY Cityworks table.

- o Equipment Updates
  - ▪ JDE will be configured to generate a standard JDE event, each time an equipment record is updated. The integration will gather the required data from JDE and update or insert the corresponding item in the EQUIPMENT Cityworks table.

- o Work Order Changes
  - ▪ JDE will be configured to generate a standard event, each time a work order is saved that is flagged to integrate to CW. The integration will retrieve the status and assigned from the JDE work order and will transmit the related data with the corresponding work order in the Cityworks WORK ORDER table.

- o Work Order Costs
  - ▪ JDE will be configured to generate a standard JDE event, each time a journal entry is successfully posted. The integration will scan the journal entry for costs associated with a work order and will transfer these costs to the corresponding work order in Cityworks. Costs will be broken down as follows:
    - ● Costs will be applied to work orders via the standard Cityworks web services.
    - ● Costs will be categorized as one of two Cityworks contracts:

- o Internal (CCWA)
- o External (Vendor)
- Costs will be sub-categorized within a contract as one of the following Cityworks costs:
  - o Labor
  - o Equipment
  - o Material (everything other than Labor and Equipment).
  - o **Please see Appendix A for an example of what these costs would look like**
- Cost category and sub-category will be determined using a UDC table defining a JDE account object code to category/sub-category relationship.
- See Appendix A for a sample of what the actual cost data would look like in Cityworks

- If JDE is not able to update the work order, the integration will write the JDE error message to a log file and the status of the work order, in Cityworks, will be updated to indicate this. **Please see the section later in this document regarding error handling.** As Cityworks does not have the ability to generate event notifications, we will need to simulate this, using database triggers. In order to minimize modifications to Cityworks and the resulting challenges during future Cityworks upgrades, intermediary tables will be created in a custom database schema, to provide needed guaranteed delivery functionality to the integration. The database triggers on Cityworks tables will feed information into the intermediary tables. The integration will poll these tables for changes that need to be processed.

Work order creation

- ○ When a work order is created in Cityworks, a database trigger will fire. This trigger will provide needed data to an intermediary table in the custom database schema, to inform the integration of the needed action. The integration will poll this table and, when a notification is received, will gather any needed data and provide any required translations and calls the standard JDE logic. The standard JDE logic will validate the information and, if the request is valid, create the corresponding work order in JDE. **Please see section later in this document on error handling for more details.** The

following information will be used by the integration to create the work order:

- Work order number
- Business Unit
- Originator
- Assigned to
- Work order status (translated)
- Description
- Parent/Child relationship (if one exists in Cityworks) (Parent project will equal JDE Capital Work Order for capital work orders)

JDE configuration

- Real Time Events in JDE

- Integration configuration details
  - The JDE UDC table will be used to provide configuration details to the integration. The configuration would include:
    - Address book category code
    - Business unit category code
    - Equipment category code
    - Inventory category code
    - Warehouse (used to determine where to look for inventory to transfer to Cityworks)
    - Work Order Status UDC translation table
    - location of the work order translation table
    - JDE account object to Cityworks contract/cost bucket
      - A UDC table will be used to provide translations from JDE object codes and Cityworks contract/cost buckets.
      - To minimize the maintenance effort, a UDC will be set up to allow CCWA to provide ranges of object accounts to contract/cost buckets.
      - If range is not defined for a particular object account, the integration will apply the associated cost to the internal/material contract/cost bucket.
      - Location of the JDE account object to Cityworks contract/cost bucket translation table
    - JDE application server name
    - JDE services port number
    - JDE environment instance and what it is associated with. **Each environment will have its own interface instance and configuration such that there is a one-to-one relationship between each JDE/Interface/Citywork instance. It would be preferable to have a separate JDE/Interface/Cityworks instance to mirror the JDE development design but this is only a requirement if CCWA wants to test the integration in each of the three (or more) environments.**

Error handling

Detecting and handling errors is an important aspect of systems integration. If an event (data synchronization) is not possible between the two systems there needs to be a way to capture this information such that manual remedial action can be taken to correct the problem so that the systems can get back in sync.

Errors are broken down into two mutually exclusive types:

- Recoverable
- Un-Recoverable

Recoverable errors are ones such as might happen if one of the two systems is not available to accept the transaction. In this case the integration will store the transaction and continue to attempt to retry the transactions such that, once the destination system becomes available again, the transaction(s) are then processed in sequence.

Any unrecoverable errors detected (meaning the integration cannot correct the error condition by re-trying) will be written to a database table in the intermediary database schema. CCWA personnel will be responsible to monitor this table in some way. (Some clients customize Cityworks screens to display these error messages on appropriate screens). Errors will be written to the error_log table containing the error messages verbatim as they are returned from each system. The error message(s) will be written to the error_log table along with the associated work order number and date/timestamp. Please see Appendix B for an example of possible error messages.

Out of Project scope Functionality

Estimating is not expected to be conducted in Cityworks so the following integration touch points will not be part of this current interface:

- Equipment rates
- Employee's rates
- Occupation rates
  - **Labor rates based on trade/skill level – often associated with union contracts**

CCWA did not indicate they needed to have the interface transfer any other associated data such as meter readings or accomplishment units from JDE to Cityworks.

We did not discuss anything related to work order billing (billing based on the costs associated to a completed work order). Any additional requirements could be made part of a second project.

Additional Configuration Not process related

Conversion Plan

List of Tables to be converted
Nothing at this time

amount of data to be converted (detail and summary)
Data to be converted includes:
Nothing at this time

Conversion Plan
Nothing at this time

Activities Required
Foundation • Database connections • JMS queues • Interface configuration in UDC table • Creation of Intermediary tables
Error handling • Error detection and processing code to provide consistent handling and formatting throughout interface. • Does not include notifications such as emails
Employees • Configure JDE Real Time Events for Address Book • Event listener • Fetch additional required data from JDE • Processing and updating Cityworks Employees
Equipment • Configure JDE Real Time Events for Equipment • Event listener • Fetch additional required data from JDE • Process and update Cityworks Equipment
Inventory • Configure JDE Real Time Events for Inventory • Event listener • Fetch additional required data from JDE

- Process and update Cityworks Inventory

Employee Time

- Create process, initiated by Payroll, to poll for Employee Time entered in the Cityworks Work Order estimate tables against work orders during a given time period as defined by Payroll. This information will be fed into the JDE Payroll Inbound System tables as a starting point for Payroll. *CCWA states that this starts with Time Keepers – they initiate and adjust and feed to Payroll*

Equipment Time

- Create a process to pick up Equipment Hours entered in the Cityworks Work Order estimate tables and create a JDE Journal Entry to represent these hours.

Work Order Create

- JDE – Capital type work orders

  ◦ Configure JDE Real Time Events for Work Orders

  ◦ Create Cityworks Project with same # as JDE WO

  ◦ Create Cityworks work order with parent being above Cityworks Project

  ◦ If JDE WO has a Parts List create this same parts list on the Cityworks work order

- Cityworks – Expense (Maintenance) type work orders

  ◦ Database trigger to update intermediary table to notify interface

  ◦ Intermediary table poller for notification of event

  ◦ Translation of Cityworks work order status

  ◦ XML-RPC request to JDE to create work order

  ◦ Notification to Cityworks of success or failure

Work Order Updates (status changes etc.)

- JDE to Cityworks

- Event listener

- Fetch required data from JDE

- Translate JDE to Cityworks status

- Update Cityworks WORKORDER table

- Cityworks to JDE

  - Database trigger to update intermediary table to notify interface

  - Intermediary table poller for notification of event

  - Translate of Cityworks to JDE status

  - XML-RPC request to JDE to update work order

  - Notification to Cityworks of success of failure

Work Order Costs

- Event listener

- Fetch journal entry lines associated with work orders

- For each line determine contract/cost type

- Ensure costs are stated in U.S. dollars

- Call Cityworks web service to update cost

  - As we cannot wrap these web service calls in a transaction there will be more work/coding required in the interface to guarantee delivery and ensure no duplication

Modify Journal Entry Post

Technical Documentation

Modification to P31113 to determine AAI doc type based on work order

Modification to P48220 to not roll up sub WO budget amounts.
Complexity of modification is low.

Transaction Server Installation and Configuration

Appendix A
Example of Costs Applied to a Work Order in Cityworks

Actual Labor Costs

Name	AcctNum	Cost	Description	Type	Group	Contractor #	Rate Type	Hours	Start Date	Finish Date	Entity Id	Entity Type
City of Prince George	7010	$60.15	Truck Driver	Contractor			Hourly	2.00	8/9/2013 12:00:00 AM	8/9/2013 12:00:00 AM		
City of Prince George	7010	$86.25	Labourer	Contractor			Hourly	8.00	8/9/2013 12:00:00 AM	8/9/2013 12:00:00 AM		
City of Prince George	7010	$86.25	Labourer	Contractor			Hourly	8.00	8/10/2013 12:00:00 AM	8/10/2013 12:00:00 AM		
City of Prince George	7010	$125.15	Plumber	Contractor			Hourly	8.00	8/10/2013 12:00:00 AM	8/10/2013 12:00:00 AM		
City of Prince George	7010	$125.15	Plumber	Contractor			Hourly	8.00	8/12/2013 12:00:00 AM	8/12/2013 12:00:00 AM		
External Contractor	7510	$287.86	Back Hoe Operator	Contractor			Hourly	6.00	8/9/2013 12:00:00 AM	8/9/2013 12:00:00 AM		
External Contractor	7510	$96.12	Labourer	Contractor			Hourly	8.00	8/9/2013 12:00:00 AM	8/9/2013 12:00:00 AM		
External Contractor	7510	$48.32	Labourer	Contractor			Hourly	4.00	8/9/2013 12:00:00 AM	8/9/2013 12:00:00 AM		
External Contractor	7510	$96.32	Labourer	Contractor			Hourly	8.00	8/10/2013 12:00:00 AM	8/10/2013 12:00:00 AM		
External Contractor	7510	$167.32	Carpenter	Contractor			Hourly	8.00	8/10/2013 12:00:00 AM	8/10/2013 12:00:00 AM		
External Contractor	7510	$167.32	Carpenter	Contractor			Hourly	8.00	8/11/2013 12:00:00 AM	8/11/2013 12:00:00 AM		
External Contractor	7510	$167.32	Carpenter	Contractor			Hourly	8.00	8/12/2013 12:00:00 AM	8/12/2013 12:00:00 AM		
External Contractor	7510	$167.32	Electrician	Contractor			Hourly	8.00	8/12/2013 12:00:00 AM	8/12/2013 12:00:00 AM		

Actual Equipment Costs

Source	AcctNum	Cost	Description	Hours	Units	Rate Type	Entity Id	Entity Type
City of Prince George	7410	$175.00	Dump Truck Unit PG1004	2.00	0.00	Hourly		
City of Prince George	7410	$700.00	Dump Truck Unit PG1004	8.00	0.00	Hourly		
City of Prince George	7410	$700.00	Dump Truck Unit PG1004	8.00	0.00	Hourly		
City of Prince George	7410	$700.00	Snow Plow Unit PG1044	8.00	0.00	Hourly		
City of Prince George	7410	$350.00	Dump Truck Unit PG1006	4.00	0.00	Hourly		
City of Prince George	7410	$700.00	Dump Truck Unit PG1006	8.00	0.00	Hourly		
City of Prince George	7410	$700.00	Dump Truck Unit PG1006	8.00	0.00	Hourly		
External Contractor	7520	$600.00	Back Hoe	6.00	0.00	Hourly		
External Contractor	7520	$600.00	Back Hoe	8.00	0.00	Hourly		
External Contractor	7520	$800.00	Crane	8.00	0.00	Hourly		
External Contractor	7530	$400.00	Back Hoe	4.00	0.00	Hourly		
External Contractor	7520	$300.00	Packer	6.00	0.00	Hourly		
External Contractor	7520	$600.00	Back Hoe	8.00	0.00	Hourly		

Actual Material Costs and Other

Source	AcctNum	Cost	Description	Units	Stock Updated	Entity Id	Entity Type
City of Prince George	7525	$8,000.00	10" pipe	400.00	False		
City of Prince George	7525	$239.23	Concrete	280.00	False		
City of Prince George	7525	$296.94	2x4 8ft	50.00	False		
City of Prince George	7525	$12.54	Gloves	2.00	False		
City of Prince George	7525	$2,400.16	Pump	1.00	False		
City of Prince George	7525	$8,000.00	10" flange	10.00	False		
External Contractor	7525	$600.00	Plywood 3/4"	20.00	False		
External Contractor	7525	$60.00	Panel	10.00	False		
External Contractor	7525	$1,320.00	Rebar 1/2"	600.00	False		
External Contractor	7525	$275.00	Steel plate 3/4"	4.00	False		
External Contractor	7525	$523.40	Sheet Rock 1/2"	40.00	False		
External Contractor	7525	$23.46	Dry wall screws	3.00	False		

Overall

	Actual	Est. (Single)	Est. (Group)	Difference	Percent Diff.
Labor	$2,099.31	$0.00	$0.00	$2,099.31	0 %
Equipment	$8,525.00	$0.00	$0.00	$8,525.00	0 %
Material	$21,708.76	$0.00	$0.00	$21,708.76	0 %
Line Items	$0.00	$0.00	$0.00	$0.00	0 %
Permits	$0.00				
Total	$32,333.07	$0.00	$0.00	$32,333.07	0 %

Appendix B
Example of Error Messages in ErrorLog table

Log | 1: IFC_ERRORLOG [30] | X

#	SID	USCHEMA	PROCNAME	ERRTIME	PRIMARYKEY	ERRMESSAGE
1	gis	JDEIntegration	xmlCreateWO	2014-03-13 13:42:14.0000000	5001227	0069Error: Posting Edit Code Does Not Allow Entry 0002Error: Record Invalid
2	gis	JDEIntegration	xmlCreateWO	2014-03-13 13:42:22.2030000	5001226	0069Error: Posting Edit Code Does Not Allow Entry 0002Error: Record Invalid
3	gis	JDEIntegration	xmlUpdateWO	2014-03-15 10:36:19.5630000	5001240	133JError: Status Not in Status Flow
4	gis	JDEIntegration	xmlCreateWO	2014-03-17 10:39:51.8610000	5001242	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
5	gis	JDEIntegration	xmlUpdateWO	2014-03-17 10:41:36.8770000	5001242	133JError: Status Not in Status Flow 0002Error: Record Invalid
6	gis	JDEIntegration	xmlUpdateWO	2014-03-17 13:59:54.1420000	5001247	133JError: Status Not in Status Flow
7	gis	JDEIntegration	xmlCreateWO	2014-03-17 15:04:19.4390000	5001251	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
8	gis	JDEIntegration	xmlCreateWO	2014-03-17 15:46:29.4080000	5001253	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
9	gis	JDEIntegration	xmlCreateWO	2014-03-18 13:11:44.1700000	5001256	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
10	gis	JDEIntegration	xmlCreateWO	2014-03-19 09:11:19.4480000	5001258	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
11	gis	JDEIntegration	xmlCreateWO	2014-03-19 13:53:34.5250000	5001227	0069Error: Posting Edit Code Does Not Allow Entry 0002Error: Record Invalid
12	gis	JDEIntegration	xmlCreateWO	2014-03-19 20:02:43.5700000	5001262	3091Error: Business Unit Number Invalid 0003Error: Blanks Invalid 0002Error: Record Invalid
13	gis	JDEIntegration	xmlCreateWO	2014-03-24 08:01:47.8880000	5001270	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
14	gis	JDEIntegration	xmlCreateWO	2014-03-24 08:30:37.9030000	5001227	0069Error: Posting Edit Code Does Not Allow Entry 0002Error: Record Invalid
15	gis	JDEIntegration	xmlUpdateWO	2014-03-26 10:50:27.8910000	5001274	133JError: Status Not in Status Flow 0002Error: Record Invalid
16	gis	JDEIntegration	xmlCreateWO	2014-03-26 10:51:17.5480000	5001275	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
17	gis	JDEIntegration	xmlCreateWO	2014-03-26 11:10:17.5320000	5001276	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
18	gis	JDEIntegration	xmlCreateWO	2014-03-26 15:17:57.5320000	5001281	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
19	gis	JDEIntegration	xmlCreateWO	2014-03-26 15:20:20.2820000	5001281	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
20	gis	JDEIntegration	xmlUpdateWO	2014-03-26 15:21:05.2510000	5001281	133JError: Status Not in Status Flow 0002Error: Record Invalid
21	gis	JDEIntegration	xmlUpdateWO	2014-03-26 15:27:12.5630000	5001282	133JError: Status Not in Status Flow 0002Error: Record Invalid
22	gis	JDEIntegration	xmlCreateWO	2014-03-26 15:27:32.5480000	5001283	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
23	gis	JDEIntegration	xmlCreateWO	2014-03-27 08:04:02.8320000	5001286	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
24	gis	JDEIntegration	xmlCreateWO	2014-03-27 09:47:47.8170000	5001289	3091Error: Business Unit Number Invalid 0002Error: Record Invalid
25	SID	JDEIntegration	xmlUpdateWO	2014-03-31 13:38:27.6570000	5000982	March 31 jasontest
26	gis	JDEIntegration	xmlCreateWO	2014-03-19 20:26:44.9760000	5001262	3091Error: Business Unit Number Invalid 0003Error: Blanks Invalid 0002Error: Record Invalid
27	gis	JDEIntegration	xmlCreateWO	2014-03-20 11:52:29.2340000	5001220	0069Error: Posting Edit Code Does Not Allow Entry 0002Error: Record Invalid
28	gis	JDEIntegration	xmlUpdateWO	2014-03-28 15:53:27.5200000	5001268	jason test error message
29	gis	JDEIntegration	xmlUpdateWO	2014-03-31 13:49:32.7030000	5000982	more testing
30	gis	JDEIntegration	xmlUpdateWO	2014-03-31 13:51:45.3200000	5000982	more testing22