City of Tacoma, WA

TACOMA POWER
UTILITY TECHNOLOGY SERVICES

REQUEST FOR PROPOSALS

ADVANCED METERING INFRASTRUCTURE
SYSTEM INTEGRATION SERVICES

SPECIFICATION NO. PS18-0242F

TACOMA POWER
TACOMA PUBLIC UTILITIES

City of Tacoma / Tacoma Public Utilities

REQUEST FOR PROPOSALS PS18-0242F
Advanced Metering Infrastructure System Integration Services

Submittal Deadline: 11:00 a.m., Pacific Time, Tuesday, August 21, 2018

Submittal Delivery: Sealed submittals will be received as follows:

By Carrier:	**In Person:**
City of Tacoma Procurement & Payables Division Tacoma Public Utilities 3628 S 35th Street Tacoma, WA 98409	City of Tacoma Procurement & Payables Division Tacoma Public Utilities Lobby Security Desk Administration Building North – Main Floor 3628 S 35th Street Tacoma, WA 98409 **Note: This is a change in location for in-person deliveries.**
By Mail: City of Tacoma Procurement & Payables Division Tacoma Public Utilities PO Box 11007 Tacoma, WA 98411-0007	

Submittal Opening: Sealed submittals in response to a RFP will be opened by a Purchasing representative and read aloud during a public bid opening held in Conference Room M-1, located on the main floor in the same building. Submittals in response to an RFP or RFQ are recorded as received but are not typically opened and read aloud. After 1:00 p.m. the day of bid opening, the names of vendors submitting proposals are posted to the website for public viewing.

Solicitation Documents: An electronic copy of the complete solicitation documents may be viewed and obtained by accessing the City of Tacoma Purchasing website at www.TacomaPurchasing.org.

- Register for the Bid Holders List to receive notices of addenda, questions and answers and related updates.
- Click here to see a list of vendors registered for this solicitation.

Pre-Proposal Meeting: A pre-proposal meeting will not be held.

Project Scope: Configuration of SAP and the integration of critical advanced metering infrastructure systems to establish a fully integrated AMI solution.

Paid Leave and Minimum Wage: Effective February 1, 2016, the City of Tacoma requires all employers to provide paid leave and minimum wages, as set forth in Title 18 of the Tacoma Municipal Code. For more information visit www.cityoftacoma.org/employmentstandards.

The following is applicable to Federal Aid Projects: The City of Tacoma in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, part 21, nondiscrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises as defined at 49 CFR, part 26, will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

Additional Information: Requests for information regarding the specifications may be obtained by contacting Richelle Krienke, senior buyer, by email to rkrienke@cityoftacoma.org.

Protest Policy: City of Tacoma protest policy, located at www.tacomapurchasing.org, specifies procedures for protests submitted prior to and after submittal deadline.

Meeting sites are accessible to persons with disabilities. Reasonable accommodations for persons with disabilities can be arranged with 48 hours advance notice by calling 253-502-8468.

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SUBMITTAL CHECK LIST

A. This checklist identifies items to be included with your submittal. Any submittal received without these required items may be deemed non-responsive and may not be considered for award.

B. ***Please do not include this specification document with your submittal. Doing so may render your submittal non-responsive.***

C. Sealed submittals must be received by the City of Tacoma Purchasing Division by the date and time specified in the Request for Proposals page at the front of this Specification or subsequent addenda. See also Section 3.04 Submittal Package Requirements.

D. Respondents are encouraged to use recycled/recyclable products and both sides of paper for printed and photocopied materials, wherever possible.

	The following items, in this order, make up your submittal package: ***Other than the forms listed below, please do not include other pages or content from this RFP document.***	
1	Title Page (Section 3.02 A)	
2	Table of Contents (Section 3.02 B)	
3	Index of confidential information, if applicable (Section 3.03)	
4	City of Tacoma Forms (Section 3.02 C / Appendix A) – No substitutions or alterations – Do not alter these forms or add them to letterhead paper or present cover letters or blank pages ahead of them. a. Signature Page (this form is intended to serve as the first page of your submittal after the Title Page and Table of Contents) b. Prime Contractor's Pre-Work Form c. Price Proposal Form d. Solution Requirements Compliance Matrix	
5	Balance of information in Section 3.02 – Content to be Submitted (items D – L)	

Provide the following in a sealed envelope or package labeled with the specification number, specification title, and Respondent name and address as indicated in Section 3.04:

- **Paper Copies**
  - ❖ **One original copy** of your complete submittal, arranged as indicated in Sections 3.01 and 3.02.
  - ❖ **Fifteen copies** of the complete original submittal.
- **Electronic copies** (USB drive, labeled with company name)
  - ❖ **One electronic copy** of the complete submittal in either Word or PDF format, arranged as indicated in Sections 3.01 and 3.02. Provide the electronic copy as a **single file** rather than multiple individual documents.
  - ❖ **One electronic copy of the completed Price Proposal Form** in Excel format.
  - ❖ **One electronic copy of Solution Requirements Compliance Matrix** in Excel format.
  - ❖ **There should be THREE documents on the USB drive**

Clearly identify paper documents as original and copies.

DELIVER TO:

By Carrier:	**By U.S. Mail:**
City of Tacoma Procurement & Payables Division Tacoma Public Utilities 3628 S 35th St Tacoma WA 98409	City of Tacoma Procurement & Payables Division Tacoma Public Utilities PO Box 11007 Tacoma WA 98411-0007

In Person:
Tacoma Public Utilities Lobby Security Desk
Administration Building North – Main Floor West
3628 S 35th St
Tacoma WA 98409

After award approval, the following will be required:

1	Contract (Appendix B) Contract incorporating terms and conditions contained herein
2	Certificate of Insurance and applicable endorsements (Appendix B)
3	City of Tacoma business license, if applicable (Appendix C – See item 1.05 B. of the Standard Terms and Conditions)
4	Verification of Washington business license (Appendix C – See item 1.05 A. of the Standard Terms and Conditions)

REQUEST FOR PROPOSALS PS18-0242F
ADVANCED METERING INFRASTRUCTURE SYSTEM INTEGRATION SERVICES

SECTION 1 – PROJECT OVERVIEW / CALENDAR / INQUIRIES

1.01 PROJECT OVERVIEW AND PURPOSE

A. The City of Tacoma, Department of Public Utilities (Tacoma Public Utilities (TPU)), is soliciting proposals to establish one or more contracts with qualified vendors to fulfill its need for the configuration of SAP and the integration of critical advanced metering infrastructure (AMI) systems to establish a fully integrated AMI Solution.

1. TPU seeks proposals that include the specific requested information, descriptions of the services, and price quotes as they relate to TPU's strategic technology goals of implementing the "best fit" AMI Solution. The proposal shall include pricing for all professional services fees ("Services") for the systems integration and project management that may be required as part of the solution as described herein.

    a. In this context, implementation refers to all efforts required for the configuration and integration of SAP to the Advanced Metering Infrastructure (AMI), Meter Data Management System (MDMS) and Meter Installation Vendor (MIV), each of which are being selected under separate procurement efforts as part of the overall AMI Program.
    b. The system integration services should include detailed design, development services, solution training, configuration services, interfaces, software integration, designing and developing minimal software modifications as necessary, development of business add-Ins (BADIs) methods to support AMI (if required and justified), testing, training, end user and technical documentation, project management, ongoing support services, and post-implementation warranty support.

2. The preference is to purchase, at a firm, fixed price, configuration, and integration services from a system integrator (SI) with proven success configuring SAP and integrating a complete AMI Solution at other similar-sized utilities. Although the City is requesting proposals for all the services defined herein, as well as optional applications, tools and services, the City may choose not to acquire one or more of any optional items included in the successful Respondent's proposal.

B. Upon completion of the Request for Proposals (RFP) process, the City intends to secure a contract for a system integrator that best meets the City's needs. The selected Respondent(s) will provide all software and required services including but not limited to, development services, configuration, installation, integration, training, and warranty support.

C. The preference is to award a single contract that supports the configuration and integration services that supports both water and electric AMI requirements. However, the City reserves the right to select any combination of individual solutions that are the best fit for its needs, right to split the award, reduce the award, or make no award, if it is in the City's best interest.

D. Submittals must comply with these specifications. Failure to comply with all provisions of the RFP may result in disqualification.

E. This solicitation may be found at www.tacomapurchasing.org: Navigate to *Contracting Opportunities* / *Services Solicitations*, scroll to this RFP and click the word *Specification*.

1.02 CALENDAR OF RFP EVENTS

The anticipated schedule of events concerning this RFP, which are tentative and may be altered at the City's sole discretion, is as follows:

Questions due, 3:00 p.m., Pacific Time	August 1, 2018
Questions and answers posted on or about	August 6, 2018
Submittal deadline, 11:00 a.m., Pacific Time	August 21, 2018
Interviews/presentations/demonstrations, if conducted	Week of October 8, 2018
Public Utility Board consideration of award, if required	January 2019

1.03 QUESTIONS AND REQUESTS FOR CLARIFICATION

A. A pre-submittal conference will not be held; however, questions and requests for clarification of these Specifications may be submitted in writing until **3:00 p.m., Pacific Time, August 1, 2018**, to Richelle Krienke, Purchasing Division, via email to rkrienke@cityoftacoma.org. Questions received after this date and time may not be answered.

1. Please indicate the RFP specification number and title in the email subject line.

2. Present your questions in MS Word format or directly in the body of the email message. Where applicable, cross reference the specific section of the RFP. Please avoid using tables to format the questions.

    a. The questions will be copied into a Word template; please keep the formatting simple (e.g., Arial 11, flush left) by avoiding multiple fonts, multiple formats, and the use of tables, styles, headers, footers, etc.

3. Questions will not be accepted by telephone or fax.

4. Questions marked confidential will not be answered.

5. Questions may be held until the deadline and answered collectively. The City may also opt to intermittently post answers, if determined to be in the City's best interest.

6. Individual answers will not be provided directly to Respondents.

7. The City reserves the discretion to group similar questions to provide a single answer or not to respond when the requested information is confidential.

8. The City will not be responsible for unsuccessful submittal of questions.

B. Written answers to questions will be posted with the Specification on or about **August 6, 2018,** on the Purchasing website at www.tacomapurchasing.org: Navigate to *Contracting Opportunities* / *Services Solicitations*, and scroll to this RFP. A notice will not be posted with the Specification if no questions are received.

C. To receive notice of the posted answers, you must register as a "bid holder" for this solicitation. Notices will not be sent if no questions are received.

D. The answers are not typically considered an addendum. (See Section 1.09)

1.04 ACCEPTANCE AND RESPONSIVENESS

A. Respondents agree to provide a minimum of 180 days from the submittal deadline for acceptance by the City.

B. Submittals will be reviewed by the City to determine compliance with the requirements and instructions specified in this RFP. Respondent is specifically notified that failure to comply with any part of this RFP may result in rejection of the submittal as non-responsive. The City reserves the right, in its sole discretion, to waive irregularities deemed to be immaterial.

1.05 CONTRACT TERM

A. The Contract is anticipated to be a minimum of two years, which can include and additional period of maintenance and support.

B. This Contract shall remain open to additional purchases (interlocal, tag-on, and piggyback) by this or other agencies for the full Contract term.

1.06 PRICING

A. Pricing under any Contract resulting from this RFP shall be firm for the Contract period unless an adjustment is mandated by statute.

B. The City may award to other than the highest ranked Respondent if the price offered by Respondent is more than the budget available for this project.

C. Submitted prices shall include costs of servicing the account, all contractual requirements during Contract period such as transportation, travel, permits, labor, insurance costs, wages, materials, tools, components, equipment, and appurtenances necessary to complete the work, which shall conform to the best practice known to the trade in design, quality, material and workmanship and be subject to these Specifications in full.

D. Surcharges of any type will not be paid.

E. The City reserves the right to negotiate all costs/prices submitted.

F. Contractor shall extend the same services at City prices to participating public agencies in accordance with the Interlocal Agreement. See item 1.05 C. above and item 1.37 "Cooperative Purchasing" in the Standard Terms and Conditions (Appendix C).

1.07 BUDGET

A. The amount budgeted for this system integration project is $4,000,000.

B. Submittals over the budgeted amount may receive reduced or zero points for "Price/Value" in the Section 3.05 Evaluation Criteria or be dropped from consideration.

1.08 RESPONDENTS ORIGINATING OUTSIDE THE UNITED STATES

A. Respondents providing submittals from outside the legal jurisdiction of the United States of America will be subject to Tacoma's City Attorney's Office (CAO) opinion as to the viability of possible litigation pursuant to a contract resulting from this Specification. If it is the opinion of the CAO that any possible litigation would be beyond reasonable cost and/or enforcement, the submittal may be excluded from evaluation.

1.09 REVISIONS TO RFP – ADDENDA

A. In the event it becomes necessary to revise any part of this RFP, addenda will be issued to registered bid holders/planholders and posted on the Purchasing website at www.tacomapurchasing.org: Navigate to *Contracting Opportunities* / *Services Solicitations*, and scroll to this RFP. Failure to acknowledge addenda may result in a submittal being deemed non-responsive.

B. Answers in response to RFP inquiries (see Section 1.03 above) are not typically provided as an addendum.

1.10 FEDERAL AID PROJECTS

A. The following is applicable to federal aid projects:

The City of Tacoma in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, part 21, nondiscrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises as defined at 49 CFR, part 26, will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

1.11 CITY CONTACT INFORMATION

A. All communications concerning this solicitation shall be directed via email to the Purchasing contact:

Richelle Krienke / rkrienke@cityoftacoma.org

B. Any Respondent seeking to obtain information, clarification, or interpretations from a City official or City employee other than the Purchasing contact or other Purchasing staff member, or any external firm or agency, is advised that such material is used at

Respondent's own risk. The City will not be bound by any such information, clarification, or interpretation.

C. Contact by a Respondent regarding this solicitation with a City employee other than the Purchasing contact or an individual specifically approved in writing by a Purchasing staff member, or contact with a firm hired by the City to provide consulting services regarding this RFP, may be grounds for rejection of Respondent's submittal.

D. NOTE: City employees and persons or firms representing the City will not contact you or seek to advise you on matters pertaining to this RFP, your submittal, or the City's expectations regarding the proposed work other than as stated in the Request for Proposals documents.

SECTION 2 – PROJECT SCOPE / TECHNICAL PROVISIONS

2.01 INTRODUCTION TO TACOMA PUBLIC UTILITIES

A. Tacoma Public Utilities: Providing services that are vital to our quality of life.

1. Tacoma Public Utilities (TPU) is a public utility organization that originated in 1893. It is made up of Tacoma Power, Tacoma Water, Tacoma Rail, and the Click! Network. Tacoma Public Utilities employs more than 1,400 people and operates entirely from revenues from the sale of utility services. TPU serves approximately 170,000 electric customers and 90,000 water customers in Tacoma and surrounding jurisdictions in suburban Pierce and King Counties in Washington State.

2. TPU is one of the largest public utilities in the United States and has earned regional, national, and international recognition for its leadership and innovation. TPU customers enjoy high quality, reliable utility services at competitive prices.

B. Tacoma Water: Providing clean, reliable water now and in the future.

1. The utility has a proud tradition of operating and maintaining one of the country's longest serving municipally owned water systems. Tacoma Water is the second largest water utility in Washington State, with a service area that spans 117 square miles and an abundant, reliable water supply. The utility serves nearly 90,000 residential, commercial, and industrial customers via a 1,381-mile system of water mains.

2. Tacoma Water owns and operates both surface water and ground water supply systems, and is also the owner/operator of a regional surface water system that includes three other regional utilities.

3. As both a wholesale and retail water supplier, Tacoma Water provides considerable retail service outside Tacoma city limits. It is a forward-thinking, collaborative, and environmentally focused organization. Through its conservative management and financial practices, Tacoma Water has earned an AA rating from Standard & Poor's and an Aa2 rating from Moody's.

C. Tacoma Power: Community value first.

1. Tacoma Power one of the largest public electric utilities in the country. Its service area spans about 180 square miles and includes nearly 2,400 miles of power lines.

2. Tacoma Power serves about 176,000 customers, and offers some of the lowest electric rates in the country. The utility supplies about 38% of its power supply from its seven hydroelectric dams, and purchases the rest of its needed supply through the Bonneville Power Administration. The utility sells excess supply in the wholesale power market.

3. TPU's largest division of 840 employees is organized into six business units: Generation, Power Management; Transmission and Distribution; Click! Network; Utility Technology Services; and Rates, Planning & Analysis. Through strategic financial planning, Tacoma Power has earned AA- bond rating from Fitch, AA rating from Standard & Poors, and an AA3 rating from Moody's.

D. About Tacoma.

1. Tacoma is a mid-sized urban port city of nearly 210,000. As the third largest city in the state of Washington, Tacoma is a diverse, progressive, international city that serves as a gateway to the Puget Sound, Pacific Rim and the rest of the world.

2. Tacoma is home to a vibrant, creative community of emerging writers, artists and musicians, photographers, filmmakers, culinarians, entrepreneurs and small business owners, each adding their own unique flair to the city's flourishing commercial landscape. Tacoma is also home to the iconic Tacoma Dome, the largest indoor venue in Washington State, drawing some of the largest names in the entertainment industry and audiences across the Pacific Northwest region.

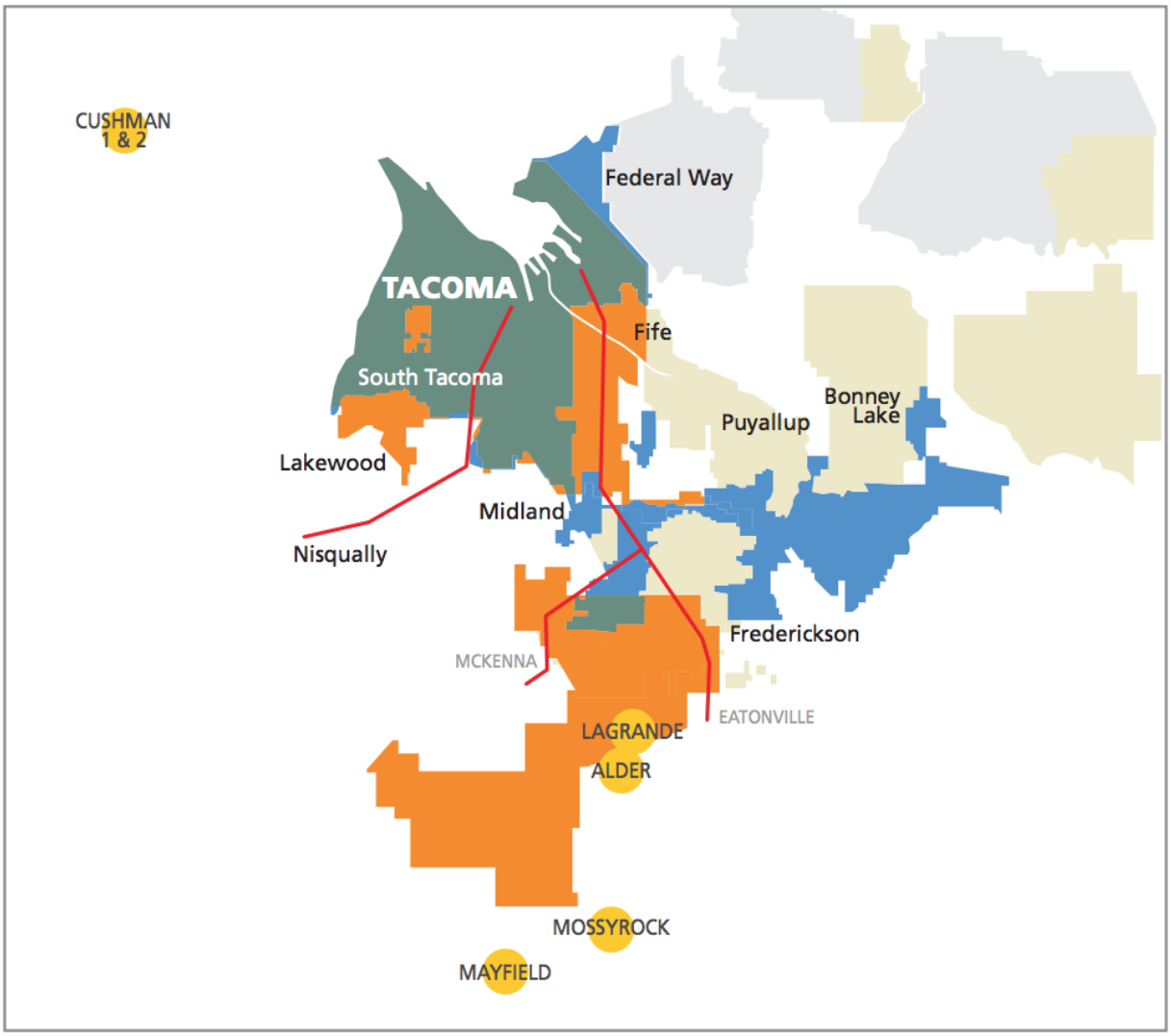
3. The City continues to attract families and individuals seeking distinct neighborhoods with charm, character, and big city amenities. Downtown Tacoma, specifically, has become a magnet for those seeking urban lifestyles without compromise, with competitively priced, well-appointed condominiums and apartments set against a picturesque backdrop of Mt. Rainier and the Puget Sound.

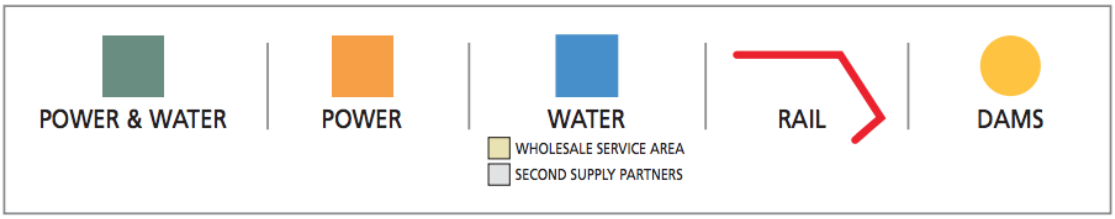
4. Tacoma's natural beauty and proximity to Mt. Rainier and the Puget Sound draws hikers, runners, bicyclists, and maritime enthusiasts to the area. The lively social scene in Tacoma is further invigorated by the thousands of students attending the University of Washington Tacoma, the University of Puget Sound, the Evergreen State College Tacoma campus, Tacoma Community College, as well as a number of local trade and technical colleges. Tacoma's prime location in the region – just 20 minutes south of the Seattle-Tacoma International Airport, 30 minutes north of the state capital in Olympia, and 20 minutes from Joint Base Lewis-McChord, the Department of Defense's premiere military installation on the West Coast - only adds to Tacoma's desirability

2.02 MAP OF TPU ELECTRIC AND WATER SERVICE TERRITORIES

See next page.

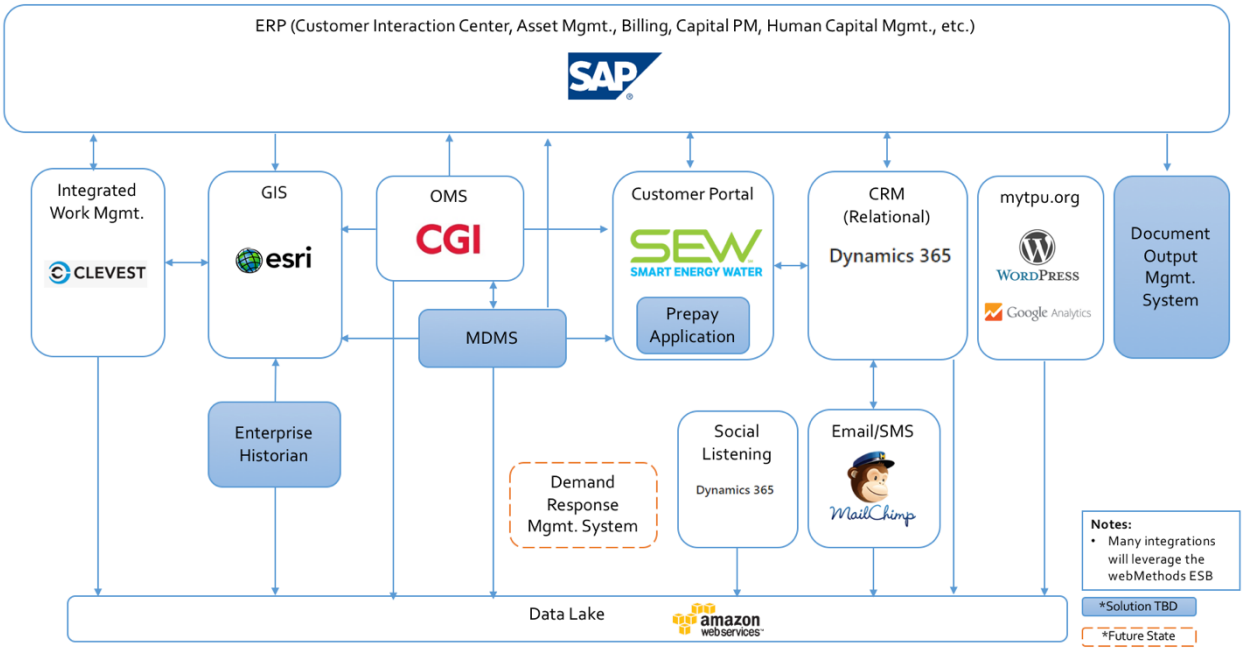
TACOMA PUBLIC UTILITIES SERVICE AREA



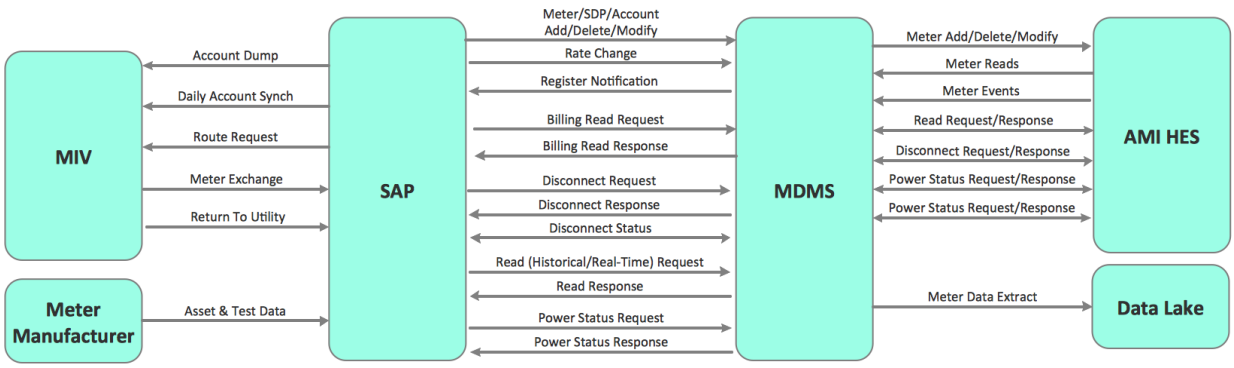


2.03 AMI SOLUTION ARCHITECTURE

TPU envisions an AMI Solution that is integrated with enterprise software solutions to realize the full benefits of its investment. This solution will be implemented over multiple phases and TPU's expected solution architecture is shown below. This RFP for System Integration Services is intended to support Release 1 (only) of the AMI Program.



2.03.1 AMI SOLUTION RELEASE 1



For these System Integration Services, TPU expects to configure and integrate the AMI head end system (HES), MDMS, SAP and MIV work management system, as shown above, to support the following uses cases, as well as the requirements listed below (Section 2.04) in its Release 1 Integrated AMI Solution:

A. Asset Life Cycle

1. Receipt and Testing of new AMI electric meters, AMI water meters, AMI communications modules for water meters and AMI network devices

2. Installation, removal and exchange of AMI network devices
3. Installation, removal and exchange of AMI electric meters
4. Installation, removal and exchange of AMI water meters
5. Installation and exchange of AMI communications modules for water meters

B. Mass Deployment

1. Planning by the MIV for the deployment of up to 1,500 AMI meters (electric and water) per day
2. Exchange of legacy electric meters by AMI electric meters
3. Exchange of legacy water meters with AMI water meters
4. Field retrofit of legacy water meters with AMI communications modules
5. Provisioning and commissioning of new AMI meters and modules

C. Billing from AMI meters

1. First monthly periodic bill after AMI meter exchange (both electric and/or water) NOTE: Water meter billing has ties to wastewater billing
2. First bimonthly periodic bill after AMI meter exchange (both electric and/or water)
3. First full periodic billing from AMI meters (both monthly and bimonthly, both electric and water)
4. Off-cycle periodic billing from AMI meters (currently budget billing off cycle estimation, both electric and/or water)
5. Periodic billing with estimated prior period on AMI meter (both electric and water)
6. Final bill from AMI meters (both monthly and bimonthly, both electric and/or water)
7. First periodic bill after move-in on AMI meter (both monthly and bimonthly, both electric and/or water)
8. First periodic bill after AMI meter replaced with standard read meter (both electric and water)
9. On demand read of AMI meter and/or use midnight read for forced move out/move in, move out/owner allocation move in, for current and/or future day
10. Use specific midnight reading for back dated move in or move out
11. Full periodic bill with missing AMI meter data
12. Reading and billing validations and exception (BPEM) management

D. Pre-pay service for AMI electric and, in the future, water meters

1. First periodic billing after AMI electric meter exchanges (existing prepayment)
2. First periodic billing after enrollment in pre-pay service
3. Calculation of remaining funds on pre-pay service after AMI meter exchange (existing prepayment summary)

E. Disconnect/Connect from AMI electric and, when supported, water meters

1. Service disconnect including scheduled disconnect
2. Service reconnect including scheduled reconnect
3. Dunning/Credit disconnect
4. Dunning/Credit reconnect
5. Disconnection on pre-pay service when no funds remain
6. Reconnect on pre-pay after no funds disconnect
7. Service disconnect hold for life support customers

8. Prepayment disconnect hold

F. Customer Services Support

1. High Bill Complaint
2. On Demand Read and display
3. Historical data request and display ping results

2.04 AMI SOLUTION FUNCTIONAL AND TECHNICAL REQUIREMENTS

The integrated AMI Solution must support all of the requirements described below. These requirements are provided for consideration in preparing a submittal, as the SI Contractor will be responsible for ensuring and documenting that all requirements are met by the integrated AMI Solution.

A. The metering/endpoint, network, and AMI HES requirements will be met by the AMI contractor.

B. The MDMS requirements will be met by the MDMS contractor.

C. The SI Contractor will develop, with TPU and AMI and MDMS contractors, the AMI Solution business requirements and maintain a requirements traceability matrix throughout the project.

2.04.1 METERING/ENDPOINT FUNCTIONAL REQUIREMENTS

A. The AMI Solution must support TPU’s current rates and tariffs. This includes:

1. Demand using rolling and block calculations
2. Net metering

B. The AMI Solution must support commercial/industrial (C&I) and residential metering for electric.

C. The AMI Solution must support C&I and residential metering for water.

D. The AMI Solution must support net and production metering.

E. The AMI Solution must support the remote change of configuration of any AMI electric meter.

F. The AMI Solution must support remote firmware upgrades for all endpoints including meter firmware and communications module firmware. In other words, all firmware in the endpoints MUST be upgradeable over the air.

G. The AMI Solution, in the event of a firmware download to any endpoint device, must provide verification of success or failure of the intended process.

H. The AMI Solution must present suitable resolution of all reported quantities including:

1. Watt-hours (1 Wh) for kWh quantities
2. Watts (1 W) for kW quantities
3. VAr-hours (1 VARh) for kVArh quantities
4. VArs (1 VAr) for kVAr quantities
5. Tenths of Volts (0.1 VAC) for Voltage quantities
6. Cubic feet (1 CF) for CFM quantities

I. The AMI Solution must collect and distribute register reads and load profile data (at least 15-minute granularity) from each residential electric meter. The following registers (time stamped at midnight) must be supported at a minimum:

1. kWh Delivered
2. kWh Received
3. kWh Net
4. kW Demand
5. Volts Instantaneous, Volts Average, Volts Min and Volts Max [Phase to Phase voltage for 2S meters and two voltage (Phase A and Phase C) for network meters]

J. The C&I AMI Solution must collect and distribute register reads and load profile data (at least 5-minute granularity) from each commercial electric meter. The following registers (time stamped at midnight) must be supported at a minimum:

1. kWh Delivered
2. kWh Received
3. kWh Net
4. kW Demand
5. kVArh Leading
6. kVArh Lagging
7. kVAh
8. kVAR Demand
9. Volts Instantaneous, Volts Average, Volts Min, and Volts Max per Phase

K. The AMI Solution must collect and distribute register reads and load profile data (at least 60-minute granularity) from each water meter. The following register (time stamped at midnight) must be supported at a minimum:

1. Gallons

L. The AMI Solution must reliably and safely perform on a real-time and pre-scheduled operation of an integrated service switch for residential electric meters. The AMI Solution must validate and report the successful operation of the switch. The service switch must have a reliable, positive locking, and safe operating mechanism.

M. The AMI Solution must monitor and report high temperature situations at the electric meter.

N. The AMI Solution must reliably and safely support real-time and pre-scheduled implementation of load limiting at the electric meter.

O. The AMI Solution must support prepayment services for electric and water accounts.

P. The meters must identify loss and restoration of power scenarios and initiate real-time alerts with a high reliability in light and heavy traffic situations. Power outage and restoration alerts must be time stamped on occurrence at the meter.

Q. The AMI Solution must collect and distribute metering events and alerts on a real-time basis. The AMI Solution must support remote configuration of events and alerts.

1. For electric meters: The events must, at a minimum, include high temperature, high and low voltage, loss and restoration of power, device failure impacting metrology accuracy, disconnect switch operation, and breach of security.
2. For water meters: The events should include leak detection, cut wire, dry pipe, and tamper.

R. The AMI Solution must support Demand Response Events that may include messaging via the AMI network or possibly other means of communications to customer. Further, the AMI system must support the reception of acknowledgment of participation in any pricing or demand-based event.

2.04.2 AMI HEAD END SYSTEM REQUIREMENTS

A. The AMI Head End System must be scalable to include all meters and AMI communications points for TPU.

B. The AMI Head End System must manage the associated AMI network equipment providing configurable reports on system status, health, and connectivity through all levels of the network.

C. The AMI Head End System must accurately maintain system time synchronization across all devices to ensure accuracy of data.

D. The AMI Head End System must support a configurable and programmable schedule for communicating with all endpoints. Different schedules may be utilized in support of Electric or Water customers.

E. The AMI Head End System must receive, validate, and forward any power outage and power restoration alarms initiated from the AMI meters and transmitted through the AMI network with minimum delay and no data loss.

2.04.3 MDMS FUNCTIONAL REQUIREMENTS

A. The MDMS must support electric and water metering.

B. The MDMS must support all current, and future, TPU schedules, rates, and tariffs. Current schedules, rates, and tariffs may be found at https://www.mytpu.org/customer-service/rates/2017-2018-rates.htm.

C. The MDMS must support the collection, validation and estimation of register reads from AMI, and other data sources, and deliver these readings to SAP ECC 6.0 EHP8, using SAP for the purposes of billing.

D. The MDMS must support collection, validation and estimation of interval data from AMI meters, and other data sources, and deliver usage calculated from this interval data to SAP ECC 6.0 EHP8 for the purposes of billing.

E. The MDMS must support the receipt and validation of events and alarms supplied by the AMI meters.

F. The MDMS must support the collection and storage of all non-revenue information (e.g., voltage measurements, pressure, events, alarms) provided from AMI meters and other devices that may communicate through the AMI communication network (e.g., voltage sensors and fault current indicators).

G. The MDMS must support the automated provisioning of AMI meters as they are installed, removed, or configuration changes are required. SAP will synchronize MDMS as meters are installed or removed and the MDMS must synchronize the AMI head end with the required information and validate the correct configuration and operation of the AMI meters.

H. The MDMS must present meter data, meter events, and meter status to internal users.

I. The MDMS must aggregate interval data by user defined groups for the purposes of analysis and reporting.

J. The MDMS must be able to calculate system peak.

K. The MDMS must be able to export meter data by individual meters or user defined groups in a format easily imported into Excel or other analysis tools.

L. The MDMS must support the remote connect and disconnect of any Power or Water AMI meter equipped with a service disconnect switch.

M. The MDMS must automatically initiate requests for service orders to SAP using meter data unification and synchronization system (MDUS) standard event management interfaces upon identification of AMI alarms or data analysis that indicates a defective meter or defective AMI communication module.

N. The MDMS must support multi-tenant ability to partition groups of meters by commodity or company to maintain privacy. This multi-organizational implementation should maintain privacy of the data for each department or utility with respect to operational personnel.

O. The MDMS must provide a standard set of operational reports and a framework for creating and managing new reports.

P. The MDMS must provide data analytics for the purposes of identifying energy theft or diversion, pasline loss, line loading, leak detection, pressure monitoring, customer segmentation, etc.

Q. The MDMS must support prepayment functionality to selected TPU customers, regardless of commodity.

2.04.4 MDMS ADDED VALUE FUNCTIONAL REQUIREMENTS

A. The MDMS should receive, process and create service orders from events from AMI Network Devices.

B. The MDMS should provide a Customer Data Portal for display of consumption (water and electric) and billing information to the customer and internal personnel as well as configurable notifications and alerts.

C. The MDMS should provide an ETL (Extract Transform and Load) service and analytics engine to support advanced analysis and reporting on AMI data and events.

2.04.5 AMI SOLUTION TECHNICAL REQUIREMENTS

Validate the AMI and MDM hardware, software, and integration for their proposed solution meets the technical requirements listed below. These requirements should include storage requirements to maintain on-line access for three months of meter data for the configuration described below.

160,000	15-Minute kWh Delivered, kWh Received, kVARh Lagging, Volts RMS and 3 Register Reads collected every 4 to 6 hours
20,000	5-Minute kWh Received, 5-Minute kWh Delivered, 5-Minute kVARh Leading, 5-Minute kVARh Lagging Intervals, 5-Minute Volts RMS (per Phase) intervals and 6 Register Reads collected every 4 to 6 hours
110,000	60-Minute Gallon or CF Register Reads collected daily
10,000	15-Minute kWh consumption collected and delivered every 15 minutes
10,000	Volts Instantaneous intervals collected and delivered every 5 minutes

A. The AMI Solution must be scalable to include all meters and AMI communications points for TPU.

B. The AMI Solution must support operating in a virtualized server environment.

C. The AMI Solution must easily integrate to different applications using industry standard interfaces, including MultiSpeak Version 3.0 or higher and IEC 61968-9.

D. The AMI Solution must have sufficient data processing performance to support the every five-minute handling of voltage measurements from five percent of the electric meters.

E. The AMI Solution will store and maintain on-line access to 24 months of meter data.

2.04.6 AMI SOLUTION SECURITY REQUIREMENTS

The AMI Solution must provide a secure implementation that demonstrates the following standards are met or provide a roadmap to the implementation of such standards or sub-bullets as outlined.

A. AMI Solution must provide a secure upgrade process for hardware, software, communication messages and endpoint devices, including PKI lifecycle management and scanning for malicious files and detection of viruses.

B. AMI Solution must provide an authentication process to verify the originator of a transmission or message in the event of message spoofing, “man-in-the-middle,” or replay messaging attacks.

C. AMI Solution must provide an authorization process to validate any individuals “right of access” to the system or subsequent control and monitoring screens.

D. AMI Solution must provide an environment sufficient to warrant the confidentiality of information to ensure that data is not exposed to unauthorized persons, processes (interfaces), and/or devices.

E. The AMI Solution must provide the sender of data proof of delivery while the recipient of such data is provided the sender’s identity as a form of non-repudiation.

F. The AMI Solution should be annually subjected to penetration and other security audits from a reputable third party security firm.

2.04.7 AMI SOLUTION NON-FUNCTIONAL REQUIREMENTS

A. The AMI Solution must be easily integrated with TPU’s current and future enterprise system landscape.

B. The AMI Solution must be easily integrated with or provide engineering reports and easy data extractions in support of the distribution network or need for AMI analytics for the purpose of planning and operations.

C. The AMI Solution must be user friendly to support access by internal users with the appropriate security settings for access or management of access based upon operational department or individual need.

D. Provide a suggested best practices methodology for backup and maintenance of the proposed solution based upon their operational experience.

E. The MDMS must be easily integrated with SAP ECC 6.0 EHP8 (using SAP MDUS Standards for EHP8) and the AMI contractor by TPU.

2.05 MINIMUM REQUIREMENTS

A. TPU requires that the selected Respondent meet the following minimum requirements:

1. Respondent has configured SAP EHP6 or higher, process integration (PI) and Software AG WebMethods for at least three years in North America.

2. Respondent has provided system integration services for an AMI and MDMS implementation in North America.

3. Respondent has provided system integration services for at least one utility customer with at least 150,000 electric and water AMI metering endpoints deployed and operational in North America.

B. Proposals may be rejected at the sole discretion of the City if the above minimum requirements are not met.

2.06 SCHEDULE AND SCOPE OF WORK

TPU requires systems configuration, integration, and testing services to implement an integrated AMI Solution that supports all of the AMI Solution Release 1 use cases and requirements identified in AMI Solution Release 1 (Section 2.03.1). TPU will select providers of AMI Technology and Services (including the AMI HES), MDMS, and Meter Installation Services (MIV), and will require these contractors to design and configure their products and coordinate their efforts with the selected SI Contractor.

TPU anticipates the design, integration, and deployment of the AMI Solution will be completed over a three-year period. This schedule will include:

A. Implementation of the Sandbox environment in Q4, 2018.

B. Release 1 configuration, integration and testing of the information systems in 2019 with completion by Q1, 2020.

C. Installation of the AMI meters starting in Q2, 2020 and completing by Q1, 2022.

D. System Integration Release 1 project will start in Q1, 2019 and complete in Q2, 2020.

The following services are to be provided by the SI Contractor in support of the Release 1 configuration of SAP and the integration of SAP, MDMS, AMI HES, and MIV:

2.06.1 PROGRAM MANAGEMENT AND SOLUTION IMPLEMENTATION

A. Maintain a PMO (Project Management Office) for the configuration, integration, testing, and deployment of the integrated AMI Solution. This project management office will report to the AMI Program PMO. This project management office will maintain a risk log, issues log, decisions log and change management consistent with the expectations of the overall AMI Program PMO.

B. Develop and maintain a detailed project plan and controls for the definition, configuration, testing, acceptance, and transition to production of the integrated AMI Solution and incorporate the detailed project plans from the AMI, MDMS, and MIV contractors, as appropriate. This includes implementing procedures for project control, risk mitigation, project tracking, and reporting of progress.

C. Establish and manage exit and entrance criteria for each of the project phases.

D. Establish a SAP change management strategy for identification, review, and management of changes to scope, budget, or timeline for the system integration project.

E. Conduct and report on regular project status meetings, risk management meetings, and other meetings and reports as is typical with a PMO.

F. Manage and track AMI, MDMS and MIV contractor deliverables and escalate any issues with contractor deliverables to TPU's Project Manager for resolution.

G. Assist in the ordering and sizing of any applicable servers and databases required to support TPU's AMI Solution requirements (such requirements for AMI and MDMS will be provided by the respective contractors and requirements for SAP will be provided by the SI Contractor). This should include a detailed and comprehensive server and database deployment document that completely defines the hardware, software and configuration specification of all servers comprising the AMI Solution.

H. Manage all documentation and knowledge transfer to ensure that TPU has a full understanding of the configurations and integrations and is able to maintain and support the integrated AMI Solution.

2.06.2 PRE-UPGRADE ASSESSMENT

TPU has a highly customized implementation of SAP and is concerned about potential impacts upon the enablement of the AMI functionality with the installation and configuration of the AMI license and capability.

A. Conduct an assessment of TPU's implementation and configuration of ECC ISU and PI to determine if the installation and enhancements will impact any of the existing configurations and customizations in place.

B. Recommend changes and tests to minimize or eliminate negative impacts of the AMI enablement.

2.06.3 BLUE PRINT (REQUIREMENTS PHASE)

Prior to the start of the AMI project, TPU will develop and provide a high-level business process model for the AMI Solution. Ensure that the coordinated blueprint schedule accommodates all the processes and requirements from this model. Ensure that the blue print phase supports all of the use cases listed in the Solutions Compliance Requirements Matrix.

A. Develop, in coordination with the AMI, MDMS, and MIV contractors as well as with City personnel, a coordinated blue print schedule for requirements workshops. Coordinated blue print schedule must meet all of the functional and technical requirements gathering requirements for the AMI, MDMS, and MIV contractors while minimizing the impact (e.g., duplicate workshops) on City personnel, and assign the attendees and facilitator for each workshop.

B. Conduct blue print workshops to produce the requisite Business Process Design (BPD) documents for the SAP processes and functionality associated with the AMI Solution.

C. Ensure that all BPD, Functional Design (FD), and Technical Design (TD) documents adhere to the City's standard documentation templates (Appendix D).

D. Review all BPD, FD, and TD documents with City personnel and gain acceptance by the City of these documents after any changes requested from the review.

E. Identify configuration, user exits, PI web services, Business Application Programming Interface (BAPI), Application Programming Interface (API), workflows, and reports needed to fully realize Phase 1 AMI required work.

F. Avoid customizations wherever possible and alert TPU to alternatives prior to implementing a customization. Share best practices from other utilities and implementations during these blue print workshops.

G. Develop, for Contractor's configuration and integration scope, and capture (from AMI, MDMS, and MIV contractors) the business requirements and the basis for functional and technical designs for the AMI Solution.

H. Construct, and maintain the business requirements lifecycle throughout the project using a Requirements Traceability Matrix (RTM).

I. Maintain a list of key decisions, design decisions, risks, issues, functionality in, functionality out, and functionality deferred throughout the Blue Print phase

2.06.4 ARCHITECTURE, FUNCTIONAL DESIGN and TECHNICAL DESIGN

A. Develop and maintain an Enterprise Solution Architecture, AMI Integration Architecture, and RICEW (Reports (R), Interface (I), Conversion (C), Enhancements (E) and Workflow (W)) tracking document. Review the architecture with TPU to gain approval.

B. Provide documentation and gain approval from the Technology Review Board (UTAB) and the Technology Advisory Board (TAB), as necessary.

C. Produce, for the configuration of SAP and the configuration of PI, FD, and TD documents, and review FD and TD documents, with the City's integration team.

D. Support and monitor the AMI, MDMS, and MIV contractors as they produce FD and TD documents and ensure that all documents are reviewed and consistent with the overall architecture.

E. Be responsible for the delivery and acceptance by the City of a complete set of FD and TD documents that represents the design for the integrated AMI Solution.

F. Ensure that all documentation is maintained in the City documentation repository (SharePoint) throughout the lifecycle of the project.

2.06.5 CONFIGURATION

A. Configure, and where required, enhance all RICEW capabilities assigned to SAP and Contractor. Work with the City's Functional Team (there are six functional resources with

plans for assignment of two or three as full-time resources to the Release 1 project) to configure SAP and PI web services to meet all the functional and technical requirements. Provide resources for the configuration and unit testing of the SAP AMI enhancements and PI integrations.

B. Assess application error logs and configure any new business process exception error (BPEM) resulting from the implementation of AMI into BDEx (by Basis Technologies).

C. Configure, and where required, enhance all RICEW capabilities assigned to the integration layer (SoftwareAG Web Methods) consistent with the Integration Architecture. Contractor may provide staff augmentation resources as determined necessary, and agreed to by TPU, at the end of the blue print sessions.

D. Coordinate configuration and development activities of AMI, MDMS, and MIV contractors as necessary to ensure that they have access to necessary test data and documentation and to facilitate and document changes to FD and TD as necessary to complete their designs and unit testing.

E. Capture and review all unit test results from the AMI, MDMS, and MIV contractors and provide a summary report of all unit testing for review and approval by TPU.

F. Escalate changes to architecture and designs to TPU personnel for review and approval. Such escalation shall include an assessment of the change, impacts, and a recommendation and alternative for resolution.

G. Ensure a complete updated documentation set (BPD, architecture, FD, TD, and RTM) to exit the configuration phase.

2.06.6 SYSTEM INTEGRATION and ACCEPTANCE TESTING

System integration, user acceptance, regression, and performance testing of the integrated AMI Solution is required. The objective of these tests will be to validate that the AMI Solution (applications, integrations, services, and interfaces) meets the defined TPU requirements.

A. Develop a test strategy for TPU's integrated AMI Solution and review this strategy with the AMI, MDMS and MIV contractors and TPU. The test strategy must include unit, system integration, performance, regression, and user acceptance testing phases.

B. Manage integration, end-to-end, performance, regression, and user acceptance testing consistent with the accepted Test Strategy. The test strategy shall document the reporting and tracking requirements for the testing phase.

C. Capture and review the unit testing test scripts from all developers, including from AMI contractor, MDMS contractor, and MIV contractor, to ensure complete testing prior to delivery to TPU for testing.

D. Assist in setup and configuration of test and production environments.

E. Assist in the configuration and implementation of a Meter Data Test Tool (MDTT) acquired by TPU to support the integration, performance, and acceptance testing.

NOTE: As an option, if Contractor provides, and TPU has contracted for, a meter data test tool, Contractor should configure and train TPU to use the tool.

F. Document all the test environments, providing a communications mechanism for these environments and their functional capabilities and release version.

G. Execute release management throughout the testing phase to ensure that application (SAP, AMI HES, MDMS, etc.) releases are coordinated and compatible and address any necessary defects or functionality. The release management process should follow the change management procedure and policies developed as part of 2.06.1.D.

H. Be responsible for defect management, including defect identification, triage, documentation, escalation, scheduling and resolution. Establish severity and priority of defects based on TPU agreed upon standards.

I. Establish a cadence of meetings and reporting on defect management and utilize TPU's HP application lifecycle management (ALM) test tool for defect tracking.

J. Leverage provided test scripts from the AMI, MDMS, and MIV contractors and develop all test scripts for each of the testing phases defined in the test strategy.

K. Ensure that all test scripts and test data requirements are setup in TPU's HP ALM and utilize TPU's HP ALM for all test tracking and reporting.

L. Produce and review with TPU test reports for each testing phase.

M. Define the test schedule and test resource requirements for each testing phase.

N. Plan for, and schedule, at least one upgrade of the AMI and MDMS applications during the AMI Integration Project.

O. Review automated testing capabilities and recommend automated testing plans.

2.06.7 TRAINING

A. Develop a training strategy that includes all training provided by the AMI, MDMS, and MIV contractors and the training material and classes to be developed and executed by TPU. The training strategy should include training requirements for new SAP functionality enabled as part of the project. The training strategy must identify the various TPU audiences and the training courses applicable for each of these audiences.

B. Review the training strategy, and subsequent training plan with the AMI, MDMS, and MIV contractors and TPU, and gain approval by TPU.

C. Develop training material for new SAP functionality and include in TPU training courses. If available, use TPU's standard training templates (Appendix D).

D. Provide introductory training on the new SAP functionality to the testing personnel prior to the start of testing.

E. Include administrator training (typically provided by the AMI and MDMS contractors) for all AMI Solution components in the training strategy and support TPU in the scheduling and coordination of this administrator training.

F. Ensure that knowledge transfer is included in the administrator training from the AMI and MDMS contractors. Establish a knowledge transfer strategy as part of the training strategy and review all knowledge transfer plans and validations with TPU. Conduct knowledge transfer sessions with TPU, if required, to ensure that TPU technology administrators have full knowledge of the configurations and enhancements enabled with the SAP configuration.

2.06.8 DOCUMENTATION

A. Produce, or acquire from the AMI, MDMS and MIV contractors and subcontractors, a full set of functional, technical, and operational documentation, including all development and testing artifacts.

B. Develop a documentation turnover list at the start of the project and ensure that all documentation is provided and approved by TPU upon completion of the project.

C. Manage, with full document version control, the documentation repository for all project documentation and deliverables.

2.06.9 GO LIVE

A. Develop a go-live plan for the integrated AMI Solution using best practices from the AMI and MDMS contractors and review such plan with TPU prior to the first mock go-live.

B. Provide at least two mock go-live activities in this plan and update the plan after each mock go-live. Include and execute a list of preparation activities and criteria for go-live in this plan.

C. Schedule and review the production environment configurations for the AMI systems and ensure that such configurations incorporate the final accepted solution.

D. Coordinate all production transports will be between SI Contractor and the City, and follow standard release and change control processes.

E. Setup a go-live command post for managing all go-live activities and post go-live activities. This will be conducted at a Tacoma designated by TPU.

F. Manage and oversee the entire go-live process and activities and provide daily, if not more often, go-live status reports.

G. Coordinate the post go-live activities and maintain a daily defect and issue list and remediation plan for the first two weeks after go-live. TPU’s preference is that key resources be onsite prior to, during, and for an agreed upon post go-live period.

H. Produce an integrated AMI Solution handover documentation package.

I. Coordinate a lessons learned review and provide a recommendations report for improvements and enhancements to the integrated AMI Solution.

2.06.10 POST PRODUCTION SUPPORT

A. Provide, in addition to the standard warranty, at least 90 days of post-production support. TPU realizes that the installation and billing from AMI meters at any quantity does not occur immediately after go-live or even necessarily within the first 90 days after go-live.

B. Contractor shall suggest the framework and timing of post-production support, including availability of project personnel who were part of the implementation and may have rolled off, to meet this post-production support requirement when a reasonable rate of meter installation and billing for AMI meters is achieved.

2.07 INSURANCE

A. City of Tacoma standard insurance requirements apply. (Appendix B.)

B. Failure by City to identify a deficiency in the insurance documentation provided by Contractor or failure of City to demand verification of coverage or compliance by Contractor with these insurance requirements shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

SECTION 3 – SUBMITTAL FORMAT, CONTENT, EVALUATION, AWARD

3.01 FORMAT AND PRESENTATION

A. Submittals should be clear, succinct, and must include the sections as described below. Sections must not exceed the prescribed page limit, excluding any appendices. For sections where no page limit is specified, Respondents should use good judgment in avoiding lengthy responses.

B. The inclusion of standard company brochures or similar marketing materials is allowed but will not be evaluated and may not be used in lieu of providing responses to Section 3.02 Content to be Submitted immediately below.

C. A full and complete response to each of the "content to be submitted" items (Section 3.02) is expected in a single location; do not use hyperlinks to other documents or cross reference to another section of your submittal document in lieu of a full response.

D. Required format:

- Page size: 8.5" x 11" (no pages larger or smaller than this size)
- Margins: 0.75" or greater
- Font and size: Arial 10 (or equivalent) or larger
- Numbered pages: Please number all pages in your submittal documents

E. For purposes of review and in the interest of the City's sustainable business practices, Respondents are encouraged to **print/copy on both sides of a single sheet of paper** wherever possible. The City encourages the use of materials (e.g., paper, dividers, binders, brochures, etc.) that contain post-consumer recycled content and are readily recyclable.

F. The City prefers the use of **recyclable 3-ring binders** to allow reviewers to remove specific pages/sections. Please do not use gum or spiral bindings. The use of materials that cannot be easily recycled such as PVC (vinyl) binders, spiral bindings, glossy paper, and plastic or glossy covers or dividers is discouraged.

G. Color is acceptable, but content should not be lost by black-and-white printing or copying.

3.02 CONTENT TO BE SUBMITTED

Provide complete and detailed responses to all items using the numbering format presented below. Organization of the submittal should follow the sequence of contents below so that essential information can be located easily during evaluation.

Submittals that are incomplete or conditioned in any way, contain alternatives or items not called for in this RFP, or are not in conformity with law, may be rejected. The City will not accept any submittal containing a substantial deviation from the requirements outlined in this RFP.

A. Title Page

1. The Title Page is to be a single sheet of paper and should include the following:

    a. RFP number and title.
    b. Firm name, address, website address, telephone number, and email address.
    c. Name, title, email address, and telephone number of the person to contact with questions or issues regarding your proposal/submittal.
    d. NOTE: Notifications regarding award will be sent to the email address provided on the Signature Page.

B. Table of Contents

1. Identify information included in your submittal by section as described in Section 3.02.

C. City of Tacoma Forms (Appendix A)

Do not alter these forms in any way or add them to letterhead paper or present cover letters or blank pages ahead of them.

1. Signature Page - The Signature Page must be signed by a person authorized to make proposals and enter into contract negotiations on behalf of your agency. This individual must be at least 18 years of age.

2. Prime Contractor's Pre-Work Form

3. Price Proposal Form

4. Solution Requirements Compliance Matrix

D. Executive Summary

1. Introduction and overview of your submittal/proposal.

2. A description and explanation of your underlying philosophy in fulfilling this scope of work.

3. A short history and description of your firm, including organizational structure, areas/regions served, number of employees, number of years in business under current and previous names, including DBAs (doing business as), etc.

4. Background information of the parent company, if any.

5. Financial statistics about your firm, including financial health, net worth, and five-year revenue forecasts.

6. Presence, if any, in the Puget Sound/Pacific Northwest region.

7. Location of the office from which this work will be performed.

8. Documentation of corporate status and business licenses.

9. Name, title, email address, and telephone number of the person authorized to execute a contract on behalf of Respondent.

10. Name, title, email address, and telephone number of the person who will be managing this Contract on behalf of Respondent.

11. Disclose any intention to utilize subcontractors to perform this work, and if so, provide similar information as above for identified subcontractors. Include any certified City of Tacoma Small Business Enterprise and/or minority/woman owned firm certified with the Washington State Office of Minority and Women's Business Enterprises. (See 3.02 K)

12. List any current or known forthcoming business ventures or related transactions such as proposed sale of company, buy-outs, acquisitions, mergers, new investors, etc., that may impact the business partner relationship with the City of Tacoma.

13. Disclose any affiliations or alliances that are in place with utility companies, software organizations, or other related firms.

14. Disclose involvement in any business litigation in the past five years, including whether your firm has, for legal reasons, been removed from a contract or failed to complete a contract as assigned.

15. Provide a statement regarding your firm's financial fitness for successfully completing this work. Disclose any past, planned or anticipated bankruptcy filings or proceedings.

E. Project Team

The personnel presented must be committed to this project for the expected term of the Contract. A majority of the resources are expected to be onsite; however, a small percentage of the personnel can be offshore resources to provide 24-hour coverage for configuration and testing activities. Indicate the onsite and remote participation of each team member in the Price Proposal Form.

1. Describe the System Integration team that will be assigned to this engagement, including the location and availability of each team member, their position, and relevance (roles and responsibilities) to the project, and the number of years of experience integrating AMI and MDMS solutions with SAP. Describe each person's experience integrating AMI and MDMS solutions for a combined electric and water utility. Describe how this team has worked together previously and where this team has worked together on past projects.

2. Describe how these staff will work as a team to accomplish this scope of work.

3. Describe how you will assure the continuity of the assigned personnel during the term of this project.

4. Describe the experience, education, and training of each person in performing SAP configuration and systems integration work for municipal governments using SAP IS-U/CCS.

5. Include resumes for all identified individuals that will be staffed on the project as an attachment.

6. Key members of the proposed project team must be present during onsite presentations at a City facility. If necessary, Respondent may form teams in support of an integrated proposal based upon the phases of implementation or expertise required during the integration of the AMI Solution; however, Respondent is required to assign a lead organization/individual for the overall project responsibility and specifically explain how its team members or subcontractors (depending upon the proposed structure) will be managed.

F. Project Methodology and Approach

1. Describe your standard project implementation methodology (no more than fifteen pages), including its configuration management, documentation management and test management practices (for new and deployed systems). Include a high-level schedule, with milestones and checkpoints, for the configuration and delivery of the integrated AMI Solution for Release 1.

2. Describe how your methodology maps to the services identified in Section 2.06 (Schedule and Scope of Work) and identify all project deliverables that are provided for each service and step of your implementation process. Include detailed information regarding any special tools, accelerators, and procedures that may differentiate from other systems integrators.

3. Describe how your methodology best delivers the Release 1 use cases identified in the Solution Compliance Matrix and minimizes the creation of exception conditions (e.g., BPEM (Business Process Exception Management) cases).

4. Describe the suggested roles and responsibilities of the City's (TPU's Utility Technology Services and General Government's Information Technology Department) team members, as well as a recommended structure for the team and the expected level of support these team members would need to provide. Any requirements or resources that the City needs to provide to achieve the schedule should be identified in this section and mapped to each of the Services identified in Section 2.06 (Schedule and Scope of Work), including estimates of time required from City personnel by level (e.g., executive, IT, functional groups).

5. Describe any tools or accelerators that will be used to improve the efficiency or quality of the blue print, configuration, or testing phases of the project.

G. Minimum Requirements Compliance

a. Provide a brief description (no more than one page) demonstrating how your company and the proposed team meet the minimum requirements detailed in Section 2.05.

H. SAP Configuration Solution Requirements Compliance

a. Complete the Solution Requirements Compliance Matrix (Appendix A) in its entirety. The requirements are formatted for a simple and succinct response and brief answers are encouraged. However, a response to each requirement and how Respondent's services and RICEW meets this requirement should be included; a simple "Comply" is not sufficient. In some cases, an additional reference document, as an attachment, will be requested to further demonstrate compliance.

NOTE: Do not modify the Excel spreadsheet by adding or removing rows, columns or tabs. Do not insert attachments in any cell. The document must be returned in its native format (Excel) as part of the electronic submission.

I. Price / Value

a. Complete the Price Proposal Form (Appendix A) in its entirety. The spreadsheet has specific instructions for submitting pricing information. Respondent may recommend, and provide pricing, for any of the software licenses and/or services for tools and accelerators that will improve the delivery of the integrated AMI Solution.

b. The City intends to negotiate a fixed price contract with the successful Respondent, for all services required under this RFP. Progress payments may be made upon the completion of identifiable milestones associated with the project, in accordance with a payment milestone schedule to be negotiated by the parties and included in the final contract documents.

NOTE: Do not modify the Excel spreadsheet by adding or removing rows, columns or tabs. Do not insert attachments in any cell. The document must be returned in its native format (Excel) as part of the electronic submission.

J. References

1. Provide at least three customer references in North America (one-page per reference) for your system integration services in support of an integrated electric and water AMI Solution, where the reference utility has deployed a similar AMI Solution within the past three years. These references should demonstrate projects of similar or greater size and similar scope as TPU, with "in production" functionality as described in this RFP.
    a. All references should be from utilities with 150,000 or more electric and/or water AMI meters using SAP.
    b. At least one reference should be from a municipal utility where Respondent provided system integration services for a combined electric/water utility with both electric and water AMI meters.

2. All references should include the following:

    a. Contact information of individuals who can speak to the work completed on referenced projects:
        i. Company name and description of primary business

ii. Website address, if applicable
iii. Contact person(s) and title
iv. Address
v. Phone number
vi. Email address

b. The number of "in production" electric AMI meters.
c. The number of "in production" water AMI meters.
d. The information systems (version of SAP software) integrated to the MDMS and AMI HES, and the number of integrations in production.
e. The AMI functionality (e.g., cycle billing, off cycle billing, prepayment, remote disconnect, customer presentment, revenue protection, distribution automation, conservation voltage reduction, etc.) that the reference utility is using.
f. The date of the first AMI meter installation and the last AMI meter installation.

K. Small Business Enterprise (SBE) / Minority and Women's Business Enterprises (MWBE)

1. Indicate whether your firm is a certified City of Tacoma Small Business Enterprise.

2. Indicate whether your firm will be partnering with, or subcontracting to, a certified City of Tacoma Small Business Enterprise. If yes, provide the full legal name of the SBE.

3. Indicate whether your firm is a minority/woman owned firm certified with the Washington State Office of Minority and Women's Business Enterprises.

4. Indicate whether your firm will be partnering with, or subcontracting to, a minority/woman owned firm certified with the Washington State Office of Minority and Women's Business Enterprises. If yes, provide the full legal name of the MWBE.

L. Credit Card Acceptance – EFT/ACH Acceptance

1. Credit Card Acceptance
   a. Provide a statement regarding your ability to meet the City's credit card requirements as well as identifying your reporting capabilities (Level I, II, or III). See item 1.41 of the Standard Terms and Conditions. (Appendix C) This information is not a consideration in the evaluation.

2. Electronic Funds Transfer (EFT) by Automated Clearing House (ACH) Acceptance
   a. Provide a statement regarding your ability to accept payment by electronic funds transfer (EFT) by Automated Clearing House (ACH). See item 1.41 of the Standard Terms and Conditions. (Appendix C) This information is not a consideration in the evaluation.

3.03 CONFIDENTIAL OR PROPRIETARY INFORMATION

A. Information that is confidential or proprietary must be clearly marked on each affected page.

B. Further, an index must be provided indicating the affected page number(s) and location(s) of all such identified material. Information not included in said index will not

be reviewed for confidentiality or as proprietary before release. See item 1.06 of the Standard Terms and Conditions. (Appendix C)

1. Present the index of confidential information as indicated in the Submittal Check List.

C. **Marking the entire submittal as "confidential" or "proprietary" or "trade secret" is not acceptable and is grounds to reject such submittal.**

3.04 SUBMITTAL PACKAGE REQUIREMENTS

A. Submittals must be sealed in an envelope or package labeled with the specification number, specification title, and Respondent name and address, and received by the City of Tacoma Purchasing Division by the date and time specified in the Request for Proposals page or subsequent addenda.

3.05 EVALUATION CRITERIA

A. A Selection Advisory Committee (SAC) will review and evaluate submittals. After the evaluation, the SAC may conduct interviews of, or request presentations/demonstrations by, selected Respondents before final selection is made.

B. The SAC may use references to clarify and verify information in submittals and interviews, if conducted, which may affect the rating. The City reserves the right to contact references other than those included in the submittal.

C. The SAC may select one or more Respondents to provide the required services.

D. The City may award to other than the highest ranked submittal or Respondent if the price submitted by Respondent is more than generally accepted industry standards or the budget available for this project. Also, note that the inclusion of fees and charges as an evaluation factor or a request for hourly rates does not require the City to select Respondent submitting the lowest cost.

E. The City reserves the right inspect the facilities or project sites of selected Respondents where work under this Contract will be performed.

F. Respondents may be asked to provide their most recent audited financial statements demonstrating Respondent's financial ability to meet the requirements of any Contract that may result from this RFP.

G. An incomplete response or no response may result in a score of zero for that criterion.

H. A serious deficiency in any one criterion, including excessive cost or costs over the budgeted amount, may be grounds for rejection.

I. The final selection, if any, will be that submittal or Respondent which, after review and potential interviews and reference checks, in the sole judgment of the City, best meets the requirements set forth in this RFP.

J. Submittals will be evaluated on the following criteria:

	Criteria	Weight
1	**SAP Configuration Solution Requirements Compliance (3.02 G and 3.02 H)**	35
2	**Qualifications/Experience of Firm and Project Team** and the means to assure the continuity of those individuals throughout the Contract term **(3.02 D, 3.02 E and 3.02 J)**	25
3	**Project Methodology and Approach (3.02 F)**	15
4	**Price / Value (3.02 I)**	20
5	**Small Business Enterprise (SBE) / Minority and Women's Business Enterprise (MWBE) (3.02 K)** a) Respondent is a City of Tacoma certified SBE firm. b) Respondent is partnering with a qualified City of Tacoma certified SBE firm. c) Respondent is a certified state of Washington Minority and Women's Business Enterprise. d) Respondent is partnering with a certified state of Washington Minority and Women's Business Enterprise.	5

3.06 INTERVIEWS / ORAL PRESENTATIONS

A. An invitation to interview or present at a City facility may be extended to selected or short-listed Respondents based on Selection Advisory Committee review of the written submittals.

B. If held, it is anticipated that interviews would comprise a half day each. Instructions will be provided to selected Respondents at least one week prior to the scheduled demonstration.

C. The SAC reserves the right to adjust scoring based on additional information and/or clarifications obtained during, or resulting from, interviews, presentations, demonstrations, or references. The SAC may determine scoring criteria for the interviews following evaluation of written submittals, including the option to rank (1, 2, 3, etc.) rather than score.

D. The City reserves all rights to begin contract negotiations without conducting interviews.

E. Respondents must be available to present within five business days' notice.

3.07 AWARD

A. After a Respondent(s) is selected by the SAC and prior to award, all Respondents will be notified in writing by the Purchasing Division.

B. Once a finalist (or finalists) has been selected by the Selection Advisory Committee, contract negotiations will begin. If a Contract is successfully negotiated, it will, if required, be submitted for final approval by the Public Utility Board and/or City Council. If an

agreement cannot be reached, negotiations will be terminated and negotiations will be conducted with the next highest scored Respondent and so on, until an agreement is reached, or until the City exercises its right to cancel the solicitation.

APPENDIX A

Signature Page

Prime Contractor's Pre-Work Form

Price Proposal Form
For the electronic copy of this form, use the link posted with this Specification or the link below:
http://cms.cityoftacoma.org/Purchasing/FormalBids/PS18-0242F_PriceProposalForm.xlsx

Solution Requirements Compliance Matrix
For the electronic copy of this form, use the link posted with this Specification or the link below:
http://cms.cityoftacoma.org/Purchasing/FormalBids/PS18-0242F_SolutionRequirementsComplianceMatrix.xlsx

SIGNATURE PAGE

CITY OF TACOMA
TACOMA PUBLIC UTILITIES

All submittals must be in ink or typewritten and must be executed by a duly authorized officer or representative of the bidding/proposing entity. If the bidder/proposer is a subsidiary or doing business on behalf of another entity, so state, and provide the firm name under which business is hereby transacted.

Submittals will be received and time stamped only at the City of Tacoma Purchasing Division, located in the Tacoma Public Utilities Administration Building North, Main Floor, at 3628 South 35th Street, Tacoma, WA 98409. **See the Request for Proposals page near the beginning of the specification for additional details.**

REQUEST FOR PROPOSALS SPECIFICATION NO. PS18-0242F
Advanced Metering Infrastructure System Integration Services

The undersigned bidder/proposer hereby agrees to execute the proposed contract and furnish all materials, labor, tools, equipment and all other facilities and services in accordance with these specifications.

The bidder/proposer agrees, by submitting a bid/proposal under these specifications, that in the event any litigation should arise concerning the submission of bids/proposals or the award of contract under this specification, Request for Bids, Request for Proposals or Request for Qualifications, the venue of such action or litigation shall be in the Superior Court of the State of Washington, in and for the County of Pierce.

Non-Collusion Declaration

The undersigned bidder/proposer hereby certifies under penalty of perjury that this bid/proposal is genuine and not a sham or collusive bid/proposal, or made in the interests or on behalf of any person or entity not herein named; and that said bidder/proposer has not directly or indirectly induced or solicited any contractor or supplier on the above work to put in a sham bid/proposal or any person or entity to refrain from submitting a bid/proposal; and that said bidder/proposer has not, in any manner, sought by collusion to secure to itself an advantage over any other contractor(s) or person(s).

_____
Bidder/Proposer's Registered Name

_____
Address

_____
City, State, Zip

_____
E-Mail Address

_____
E.I.No. / Federal Social Security Number Used on Quarterly Federal Tax Return, U.S. Treasury Dept. Form 941

_____
Signature of Person Authorized to Enter into Contracts for Bidder/Proposer — Date

_____
Printed Name and Title

_____
(Area Code) Telephone Number / Fax Number

_____
State Business License Number
in WA, also known as UBI (Unified Business Identifier) Number

_____
State Contractor's License Number
(See Ch. 18.27, R.C.W.)

Addendum acknowledgement #1_____ #2_____ #3_____ #4_____ #5_____

THIS PAGE MUST BE SIGNED AND RETURNED WITH SUBMITTAL.

City of Tacoma
Community & Economic Development
Office of Small Business Enterprise
747 Market Street, Room 900
Tacoma, WA 98402
253-591-5224 or 253-573-2435

PRIME CONTRACTOR'S PRE-WORK FORM

Company Name _____ **Telephone** _____

Address/City/State/Zip Code _____

Specification Number _____ **Specification Title** _____

JOB CATEGORIES SPECIFY	TOTAL EMPLOYEES		TOTAL MINORITY EMPLOYEES		BLACK		ASIAN or PACIFIC ISLANDER		AMERICAN INDIAN or ALASKAN NATIVE		HISPANIC	
	M	F	M	F	M	F	M	F	M	F	M	F
Officer / Managers												
Supervisors												
Project Managers												
Office / Clerical												
Apprentices												
Trainees												
TOTALS												

CONTRACTOR'S PROJECTED WORK FORCE - THIS PROJECT

Superintendent												
Foreman												
Operators												
Laborers												
Apprentice												
Trainee												
TOTALS												

Type or Print Name of Responsible Officer / Title _____ **Signature of Responsible Officer** _____ **Date** _____

INSTRUCTIONS FOR COMPLETING
PRIME CONTRACTOR'S PRE-WORK FORM

This form only applies to employees who will be working on this specific project.

1. "Heading" the company name and address should reflect the subcontractor actually doing business with the City of Tacoma. If this address is different from that of the Equal Employment Opportunity Officer that administers the EEO programs of the company, the Equal Employment Opportunity Officer's address should be noted in the "Comments" section at the bottom of the form. "Telephone" should contain the area code, telephone number and extension (if any) for the Equal Employment Officer or the responsible official.

2. "Job Categories" at the extreme left hand column of the form specifying "Job Categories" lists "Officials & Managers." You are to list in addition to Officials & Managers any appropriate job titles such as Sales Workers, Office/Clerical, Professionals, Technical, etc., as they apply to your own company and only as pertains to this specific project.

3. The "M" and "F" headings at the top of each column refer to "Male" and "Female."

4. The "Total Employees" column should list the total number of male employees under "M" and the total female number of female employees under "F" for each job category listed. They should be listed in a similar manner in the "Total" category at the bottom of the form. The "Total Employees" column should include all those employees listed under "Non-Minority" and "Total Minorities." "Non-Minority" should include all employees not listed in the minority columns.

5. "Total Minorities" should include all employees listed under the "Black," "Asian or Pacific Islander" (A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes, for example, China, India, Japan, Korea, the Philippine Islands, and Samoa.), "American Indian or Alaskan Native," and "Hispanic" columns. These columns should include only employees who are members of that particular minority group. Designation and definitions of ethnic/national origin status follow the instructions and definitions of the Federal EEO-1 Form of the U. S. Equal Employment Opportunity Commission.

6. "Totals" this line should reflect the total of all lines in each of the above columns.

7. The signature of your company's designated responsible official or similar official responsible for equal employment opportunity must appear in the designated space at the bottom of the form. Please PRINT OR TYPE the person's name on the top line across from the signature. This is required since some signatures are difficult to read.

8. "Comments" this section is to be used as needed for explanations to under utilization rate or lack of turnover, proposed expansion or reduction of staff or any other pertinent information you believe will help clarify or explain the data presented on the form. If you need additional space, please explain on a separate sheet of paper.

9. If you need assistance or have questions regarding the completion of this form, please call the SBE Office at 253-591-5224 or 253-573-2435

Price Proposal Form
Request for Proposals PS18-0242F
AMI System Integration Services

Vendor Name:
Address:

Request for Proposals
for
AMI System Integration Services
Pricing Synopsis

Charges: *In the space provided below please indicate each project role, estimated # of hours and total fees.*
Please add a detailed schedule in "Hours by Resource" tab indicating the number or hours required by each resource per month for each Task.
Please indicate any accelerators, tools or other services available in the "Optional Tools" tab.
Please add any assumptions to the proposed pricing and estimated hours in the "Assumptions" tab.
Please see pricing section in RFP Bid Specification for specific details regarding your priced proposal.

Worksheet

Project Role / Name	#/Hours	Rate	Total Billable Fee	Daily Expense Fee	# of billable work days	Total Billable Expense	AirFare / Amtrack	Total Number of Trips	Estimated Cost
i.e.administrator/ John Smith	1.00	$ 15.00	$ 15.00	$ 100.00	1	$ 100.00	$ 100.00	1	$ 100.00
1)		$ -	$ -			$ -			$ -
2)		$ -	$ -			$ -			$ -
3)		$ -	$ -			$ -			$ -
4)		$ -	$ -			$ -			$ -
5)		$ -	$ -			$ -			$ -
6)		$ -	$ -			$ -			$ -
7)		$ -	$ -			$ -			$ -
8)		$ -	$ -			$ -			$ -
9)		$ -	$ -			$ -			$ -
10)		$ -	$ -			$ -			$ -
11)		$ -	$ -			$ -			$ -
12)		$ -	$ -			$ -			$ -
13)		$ -	$ -			$ -			$ -
14)		$ -	$ -			$ -			$ -
15)		$ -	$ -			$ -			$ -
16)		$ -	$ -			$ -			$ -

17)		$ -	$ -			$ -			$ -
18)		$ -	$ -			$ -			$ -
19)		$ -	$ -			$ -			$ -
20)		$ -	$ -			$ -			$ -

*** add more roles here if needed**

Total Hours and Fees: **0** **$ -** *** not to exceed**

Total Daily Expense: **$ -** *** not to exceed**

Estimated Travel: **$ -**

Total Delivered Price: **$ -**

Optional Pricing Submittal

If you would like to offer TPU an alternative pricing option, please detail your offer in the space highlited below:

Optional Fixed Price Proposal

* A detailed breakout of your fixed price proposal (inclusive of all titles, hours, and rates) must be attached for this option to be considered.

Total Fees: $ -

17)		$ -	$ -			$ -			$ -
18)		$ -	$ -			$ -			$ -
19)		$ -	$ -			$ -			$ -
20)		$ -	$ -			$ -			$ -

*** add more roles here if needed**

Total Hours and Fees: **0** **$ -** *** not to exceed**

Total Daily Expense: **$ -** *** not to exceed**

Estimated Travel: **$ -**

Total Delivered Price: **$ -**

Optional Pricing Submittal

If you would like to offer TPU an alternative pricing option, please detail your offer in the space highlited below:

Optional Fixed Price Proposal

* A detailed breakout of your fixed price proposal (inclusive of all titles, hours, and rates) must be attached for this option to be considered.

Total Fees: $ -

Solution Compliance Requirements Matrix

Request for Proposals PS18-0242F
AMI System Integration Services

Respondent Name:

Table of Contents

NOTE: Spreadsheet must NOT be reformatted in any way. Failure to follow this instruction may

Click on any of the cells below to go to the designated matrix tab.

RFP Instructions	**Please read these instructions for explanation of this matrix and how to answer the requirements and questions.**
Vendor Information	This section covers details on the vendor and their references as well as several questions about vendor practices and capabilities
Use Cases	This section outlines all the use cases for AMI which Respondent is required to configure SAP ECC and MDUS integrations to support.
SDLC	This section covers the development and configuration procedure requirements for the Systems Integrator
IT Support	This section covers the software and implementation support requirements for the implementation and ongoing operation of the AMI Solution.
Testing	This section covers the software testing requirements for the integrated AMI solution
Training	This section covers the training requirements for the integrated AMI solution.
SAP Integrations	This section covers the interface and integration requirements between MDMS and SAP

APPENDIX B

Sample Contract

Standard Certificate of Insurance and Endorsement Requirements

SERVICES CONTRACT

THIS CONTRACT, made and entered into effective by and between the CITY OF TACOMA, a municipal corporation of the State of Washington (hereinafter referred to as the "CITY"), and , a [INSERT TYPE OF BUSINESS ENTITY – CORPORATION, LLC, LLP SOLE PROPRIETOR ETC], (hereinafter referred to as "CONTRACTOR");

In consideration of the mutual promises and obligations hereinafter set forth, the Parties hereto agree as follows:

1. Scope of Services/Work

The CONTRACTOR agrees to diligently and completely perform the services and/or deliverables described in Exhibit [INSERT A BRIEF DESCRIPTION OF THE WORK TO BE PERFORMED, INCLUDING EXHIBIT REFERENCES A, B ETC.] attached hereto and incorporated herein.

2. Order of Precedence

To the extent there is any discrepancy or conflict between and/or amongst the terms of this Contract and Exhibit(s) _____, the controlling terms for this Contract will be interpreted in the following order of precedence, with the first number being the most controlling, and the last number being the least controlling: Contract, Exhibit ___, Exhibit _____. [INSERT EXHIBIT REFERENCES IN ORDER OF WHICH IS MOST CONTROLLING]

3. Changes to Scope of Work.

The CITY shall have the right to make changes within the general scope of services and/or deliverables upon execution in writing of a change order or amendment hereto. If the changes will result in additional work effort by CONTRACTOR, the CITY will agree to reasonably compensate the CONTRACTOR for such additional effort up to the maximum amount specified herein or as otherwise provided by City Code.

4. On Call Contracts

If the services and deliverables performed under this Contract are on an on call or as assigned basis, service and deliverables may be assigned by Task Authorization or Statements of Work.

5. Term

All services shall be satisfactorily completed on or before [INSERT CONTRACT TERMINATION DATE] and this Contract shall expire on said date unless mutually extended in writing by the Parties.

6. Renewals

At CITY's sole option, the Term of this Contract may be renewed for additional [INSERT THE RENEWAL PERIOD – 1 YEAR, ETC] periods, not to exceed [INSERT THE MAXIMUM NUMBER OF RENEWAL PERIODS]. CITY will provide written notice of its intent to exercise any renewal options at least 30 days prior to the then existing Term and a written Amendment to this Contract will be mutually executed.

7. Delay

Neither party shall be considered to be in default in the performance of this Contract to the extent such performance is prevented or delayed by any cause which is beyond the reasonable control of the affected party and, in such event, the time for performance shall be extended for a period equal to any time lost as a result thereof. In the event CONTRACTOR is unable to proceed due to a delay solely attributable to CITY, CONTRACTOR shall advise CITY of such delay in writing as soon as is practicable.

8. Compensation

The CITY shall compensate the CONTRACTOR for the services and deliverables performed under this Contract [in accordance with OR on the basis of] [INSERT DESCRIPTION OF COMPENSATION ARRANGEMENTS – REFERENCE EXHIBIT, TIME AND MATERIALS, LUMP SUM ETC.]

9. Not to Exceed Amount

The total price to be paid by CITY for CONTRACTOR'S full and complete performance of the Scope of Work hereunder shall not exceed $ [INSERT TOTAL AMOUNT OF CONTRACT] without the written consent of the CITY. Said price shall be the total compensation for CONTRACTOR'S performance hereunder including, but not limited to, all work, deliverables, materials, supplies, equipment, subcontractor's fees, and all reimbursable travel and miscellaneous or incidental expenses to be incurred by CONTRACTOR.

In the event the CONTRACTOR incurs cost in excess of the sum authorized for service under this Contract, the CONTRACTOR shall pay such excess from its own funds, and the CITY shall not be required to pay any part of such excess, and the CONTRACTOR shall have no claim against the CITY on account thereof.

10. Payment

CONTRACTOR shall submit XXXXXXXX {Monthly, Weekly, Annually, Contract Milestones} invoices for services completed and/or deliverables furnished during the invoice period. Upon CITY'S request, CONTRACTOR shall submit necessary and appropriate documentation, as determined by the CITY, for all invoiced services and deliverables.

Payment shall be made through the CITY'S ordinary payment process, and shall be considered timely if made within 30 days of receipt of a properly completed invoice. All payments shall be subject to adjustment for any amounts, upon audit or otherwise, determined to have been improperly invoiced. The CITY may withhold payment to the CONTRACTOR for any services or

deliverables not performed as required hereunder until such time as the CONTRACTOR modifies such services or deliverables to the satisfaction of the CITY.

11. Independent Contractor Status

The services and deliverables shall be furnished by the CONTRACTOR as an independent Contractor, and nothing herein contained shall be construed to create an employer and employee relationship. The CONTRACTOR shall provide at its sole expense all materials, office space, and other necessities to perform its duties under this Contract, unless stated otherwise in this Contract. No payroll or employment taxes of any kind shall be withheld or paid by the CITY with respect to payments to CONTRACTOR. The payroll or employment taxes that are the subject of this paragraph include, but are not limited to, FICA, FUTA, federal income tax, state personal income tax, state disability insurance tax and state unemployment insurance tax. By reason of CONTRACTOR's status as an independent Contractor hereunder, no workers' compensation insurance has been or will be obtained by the CITY on account of CONTRACTOR. CONTRACTOR may be required to provide the CITY proof of payment of these said taxes and benefits. If the CITY is assessed or deemed liable in any manner for those charges or taxes, the CONTRACTOR agrees to hold the CITY harmless from those costs, including attorney's fees.

12. Services Warranty

The CONTRACTOR warrants that all services performed pursuant to this Contract shall be generally suitable for the use to which CITY intends to use said services and deliverables as expressed in the Scope of Work. In the performance of services under this Contract, the CONTRACTOR and its employees further agree to exercise the degree of skill and care required by customarily accepted good practices and procedures followed by professionals or service providers rendering the same or similar type of service. All obligations and services of the CONTRACTOR hereunder shall be performed diligently and completely according to such professional standards.

Unless a higher standard or longer periods of warranty coverage for product deliverables provided under this Contract is provided herein, CONTRACTOR agrees to correct any defect or failure of deliverables supplied under this Contract which occurs within one year from _____[FILL IN APPROPRIATE TIME FRAME, E.G. GO LIVE, FIRST USE, ETC]. During said warranty period, all of the costs (including shipping, dismantling and reinstallation) of repairs or corrections is the responsibility of the CONTRACTOR. If CONTRACTOR is not the manufacturer of the item of equipment, CONTRACTOR agrees to be responsible for this warranty and shall not be relieved by a lesser manufacturer's guarantee. This Contract warranty period shall be suspended from the time a significant defect is first documented by the CITY until repair or replacement by CONTRACTOR and acceptance by the CITY. In the event less than ninety (90) days remain on the warranty period (after recalculating), the warranty period shall be extended to allow for at least ninety (90) days from the date of repair or replacement and acceptance by the CITY.

13. Reliance on CITY Provided Data or Information

If the CONTRACTOR intends to rely on information or data supplied by the CITY, other CITY contractors or other generally reputable sources without independent verification, such intent shall be brought to the attention of the CITY.
CONTRACTOR is not entitled to rely on any information or data supplied by the CITY and is obligated to independently verify any information or data supplied by the CITY.

14. Contract Administration

[INSERT NAME TITLE AND DEPARTMENT OF CONTRACT ADMINISTRATOR] for the CITY shall have primary responsibility for contract administration and approval of services to be performed by the CONTRACTOR, and shall coordinate all communications between the CONTRACTOR and the CITY.

15. Right to Audit

During the Term of this Contract, and for six (6) years thereafter, the CITY shall have the right to inspect and audit during normal business hours all pertinent books and records of the CONTRACTOR and/or any sub-contractor or agent of CONTRACTOR that performed services or furnished deliverables in connection with or related to the Scope of Work hereunder as reasonably needed by CITY to assess performance, compliance and quality assurance under this Contract or in satisfaction of City's public disclosure obligations, as applicable. CONTRACTOR shall, upon three (3) business days of receipt of written request for such inspection and audit from CITY, provide the CITY with, or permit CITY to make, a copy of any work-related books, accounts, records and documents, in whole or in part, as specified in such request. Said inspection and audit shall occur in Pierce County, Washington or such other reasonable location as the CITY selects. The CITY shall bear the cost of any inspection audit requested hereunder, provided, that if an inspection audit in accordance with the foregoing provisions discloses overpricing or overcharges (of any nature) by the CONTRACTOR to the CITY in excess of one percent (1%) of the total contract billings, in addition to making adjustments for the overcharges, the reasonable actual cost of the CITY's audit shall be reimbursed to CITY by CONTRACTOR. Any adjustments or payments that must be made as a result of any audit and inspection hereunder shall be made no later than 90 days from presentation of CITY's findings to CONTRACTOR.

CONTRACTOR shall ensure that the foregoing inspection, audit and copying rights of the CITY are a condition of any subcontract, agreement or other arrangement under which any other person or entity is permitted to perform the Scope of Work under this Contract.
Upon CITY's request, CONTRACTOR shall make available to CITY all accounts, records and documents related to the performance of this Contract for CITY's inspection, auditing or evaluation during normal business hours as reasonably needed by CITY to assess performance, compliance and quality assurance under this Contract or in satisfaction of City's public disclosure obligation, as applicable.

16. Records Retention

The CONTRACTOR shall establish and maintain records in accordance with requirements prescribed by the CITY, with respect to all matters related to the performance of this Contract. Except as otherwise authorized by the CITY, the CONTRACTOR shall retain such records for a period of _____[INSERT THE TIME THE RECORDS SHOULD BE KEPT. MOST COMMON IS 6 YEARS] years after receipt of the final payment under this Contract or termination of this Contract.
CONTRACTOR shall retain any City records or data hosted in a Cloud Service. CITY shall have the ability to access its records hosted in a Cloud Service at any time during the Term of this Contract. CITY may export and retrieve its records during the Term of the Contract and, no later than 30 days from the termination of this Contract, CONTRACTOR shall export CITY records to City's custody and control.

17. Specific Personnel

If before, during, or after the execution of this Contract, CONTRACTOR represents to the CITY that certain personnel would or will be responsible for performing services and deliverables under this Contract, then the CONTRACTOR is obligated to ensure that said personnel perform said Contract services to the maximum extent permitted by law. This Contract provision shall only be waived by written authorization by the CITY, and on a case by case basis.

18. Notices

Except for routine operational communications, which may be delivered personally or transmitted by electronic mail all notices required hereunder shall be in writing and shall be deemed to have been duly given if delivered personally or mailed first-class mail, postage prepaid, to the parties at the following addresses:

CITY: Name: Title: Address: Telephone No.: E-mail:	CONTRACTOR: Name: Title: Address: Telephone No.: E-mail:

19. Termination

Except as otherwise provided herein, the CITY may terminate this Contract at any time, with or without cause, by giving ten (10) business days written notice to CONTRACTOR. In the event of termination, all finished and unfinished work prepared by the CONTRACTOR pursuant to this Contract shall be provided to the CITY. In the event CITY terminates this Contract due to the CITY's own reasons and without cause due to the CONTRACTOR's actions or omissions, the CITY shall pay the CONTRACTOR the amount due for actual work and services necessarily performed under this Contract up to the effective date of termination, not to exceed the total compensation set forth herein. Termination of this Contract by CITY shall not constitute a waiver

of any claims or remaining rights the CITY may have against CONTRACTOR relative to performance hereunder.

20. Suspension

The CITY may suspend this Contract, at its sole discretion, upon seven (7) business days written notice to the CONTRACTOR. Such notice shall indicate the anticipated period of suspension. Any reimbursement for expenses incurred due to the suspension shall be limited to the CONTRACTOR'S reasonable expenses and shall be subject to verification. The CONTRACTOR shall resume performance of services under this Contract without delay when the suspension period ends. Suspension of this Contract by CITY shall not constitute a waiver of any claims or remaining rights the CITY may have against CONTRACTOR relative to performance hereunder.

21. Taxes

CONTRACTOR is responsible for the payment of all charges and taxes applicable to the services performed under this Contract, and CONTRACTOR agrees to comply with all applicable laws regarding the reporting of income, maintenance of records, and all other requirements and obligations imposed pursuant to applicable law. If the CITY is assessed, made liable, or responsible in any manner for such charges or taxes, the CONTRACTOR holds CITY harmless from such costs, including attorney's fees.

If CONTRACTOR fails to pay any taxes, assessments, penalties, or fees imposed by any governmental body, including by Tacoma City ordinance, and including by a court of law, CITY will deduct and withhold or pay over to the appropriate governmental body those unpaid amounts upon demand by the governmental body. Any such payments shall be deducted from the CONTRACTOR's total compensation.

22. Licenses and Permits

The CONTRACTOR, at its expense, shall obtain and keep in force any and all necessary licenses and permits. The CONTRACTOR shall obtain a business license as required by Tacoma Municipal Code Subtitle 6B.20 and shall pay business and occupation taxes as required by Tacoma Municipal Code Subtitle 6A.30.

23. Indemnification

CONTRACTOR shall indemnify, defend, and hold harmless the CITY, its officials, officers, agents, employees, and volunteers, from any and all claims, demands, damages, lawsuits, liabilities, losses, liens, expenses and costs arising out of the subject matter of this Contract; provided that this provision shall not apply to the extent that damage or injury results from the sole negligence of the CITY, or its officers, agents, or employees. This indemnification shall extend to and include attorneys' fees and the cost of establishing the right of indemnification hereunder in favor of the CITY. This indemnification shall survive the termination of this Contract.

CONTRACTOR hereby warrants and represents CONTRACTOR is owner of any products, solutions or deliverables provided and licensed under this Contract or otherwise has the right to grant to CITY the licensed rights under this Contract, without violating the rights of any third party worldwide. CONTRACTOR shall, at its expense, defend, indemnify and hold harmless CITY and its employees, officers, directors, contractors, agents and volunteers from any claim or action against CITY which is based on a claim against CITY for infringement of a patent, copyright, trademark, or other propriety right or appropriation of a trade secret.
It is expressly agreed that with respect to design professional services performed by CONTRACTOR herein, CONTRACTOR's duty of indemnification, including the duty and cost to defend, against liability for damages arising out of such services or out of bodily injury to persons or damage to property shall, as provided in RCW 4.24.115 apply only to the extent of CONTRACTOR's negligence.

24. Title 51 Waiver

CONTRACTOR specifically assumes potential liability for actions brought by the CONTRACTOR'S own employees against the CITY and, solely for the purpose of this indemnification and defense, the CONTRACTOR specifically waives any immunity under the state industrial insurance law, Title 51 RCW. THE CONTRACTOR RECOGNIZES THAT THIS WAIVER WAS THE SUBJECT OF MUTUAL NEGOTIATION.

25. Insurance

During the course and performance of the services herein specified, CONTRACTOR will maintain the insurance coverage in the amounts and in the manner specified in the City of Tacoma Insurance Requirements as is applicable to the services and deliverables provided under this Contract. The City of Tacoma Insurance Requirements documents is fully incorporated herein by reference.

26. Nondiscrimination

The CONTRACTOR agrees to take all steps necessary to comply with all federal, state, and City laws and policies regarding non-discrimination and equal employment opportunities. The CONTRACTOR shall not discriminate in any employment action because of race, religion, creed, color, national origin or ancestry, sex, gender identity, sexual orientation, age, marital status, familial status, veteran or military status, the presence of any sensory, mental or physical disability or the use of a trained dog guide or service animal by a disabled person. In the event of non-compliance by the CONTRACTOR with any of the non-discrimination provisions of this Contract, the CITY shall be deemed to have cause to terminate this Contract, in whole or in part.

27. Conflict of Interest

No officer, employee or agent of the CITY, nor any member of the immediate family of any such officer, employee or agent as defined by City ordinance, shall have any personal financial interest, direct or indirect, in this Contract, either in fact or in appearance. The CONTRACTOR shall comply with all federal, state, and City conflict of interest laws, statutes and regulations. The CONTRACTOR represents that the CONTRACTOR presently has no interest and shall not acquire any interest, direct or indirect, in the program to which this Contract pertains which would conflict in any manner or degree with the performance of the CONTRACTOR'S services and obligations hereunder. The CONTRACTOR further covenants that, in performance of this Contract, no person having any such interest shall be employed. The CONTRACTOR also agrees that its violation of the CITY'S Code of Ethics contained in Chapter 1.46 of the Tacoma Municipal Code shall constitute a breach of this Contract subjecting the Contract to termination.

28. City ownership of Work/Rights in Data and Publications:

To the extent CONTRACTOR creates any Work subject to the protections of the Copyright Act (Title 17 U.S.C) in its performance of this Contract, CONTRACTOR agrees to the following: The Work has been specially ordered and commissioned by CITY. CONTRACTOR agrees that the Work is a "work made for hire" for copyright purposes, with all copyrights in the Work owned by CITY. To the extent that the Work does not qualify as a work made for hire under applicable law, and to the extent that the Work includes material subject to copyright, CONTRACTOR hereby assigns to CITY, its successors and assigns, all right, title and interest in and to the Work, including but not limited to, all patent, trade secret, and other proprietary rights and all rights, title and interest in and to any inventions and designs embodied in the Work or developed during the course of CONTRACTOR'S creation of the Work. CONTRACTOR shall execute and deliver such instruments and take such other action as may be required and requested by CITY to carry out the assignment made pursuant to this section. Any documents, magnetically or optically encoded media, or other materials created by CONTRACTOR pursuant to this Contract shall be owned by CITY and subject to the terms of this sub-section. To the maximum extent permitted by law, CONTRACTOR waives all moral rights in the Work. The rights granted hereby to CITY shall survive the expiration or termination of this Contract. CONTRACTOR shall be solely responsible for obtaining releases for the performance, display, recreation, or use of copyrighted materials.

29. Public Disclosure

This Contract and documents provided to the CITY by CONTRACTOR hereunder are deemed public records subject to disclosure under the Washington State Public Records Act, Chapter 42.56 RCW (Public Records Act). Thus, the CITY may be required, upon request, to disclose this Contract and documents related to it unless an exemption under the Public Records Act or other laws applies. In the event CITY receives a request for such disclosure, determines in its legal judgment that no applicable exemption to disclosure applies, and CONTRACTOR has complied with the requirements of sub-section B herein, CITY agrees to provide CONTRACTOR ten (10) days written notice of impending release. Should legal action thereafter be initiated by CONTRACTOR to enjoin or otherwise prevent such release, all expense of any such litigation shall be borne by CONTRACTOR, including any damages, attorneys fees or costs awarded by

reason of having opposed disclosure. CITY shall not be liable for any release where notice was provided and CONTRACTOR took no action to oppose the release of information. Notice of any proposed release of information pursuant to Chapter 42.56 RCW, shall be provided to CONTRACTOR according to the "Notices" provision herein.

30. Confidential or Proprietary Records Must be Marked

If CONTRACTOR provides the CITY with records that CONTRACTOR considers confidential or proprietary, CONTRACTOR must mark all applicable pages of said record(s) as "Confidential" or "Proprietary." If CONTRACTOR fails to so mark record(s), then (1) the CITY, upon request, may release said record(s) without the need to satisfy the requirements of subsection A above; and (2) the CONTRACTOR expressly waives its right to allege any kind of civil action or claim against the CITY pertaining to the release of said record(s).

31. Duty of Confidentiality

CONTRACTOR acknowledges that unauthorized disclosure of information or documentation concerning the Scope of Work hereunder may cause substantial economic loss or harm to the CITY.

Except for disclosure of information and documents to CONTRACTOR's employees, agents, or subcontractors who have a substantial need to know such information in connection with CONTRACTOR's performance of obligations under this Contract, the CONTRACTOR shall not without prior written authorization by the CITY allow the release, dissemination, distribution, sharing, or other publication or disclosure of information or documentation obtained, discovered, shared or produced pursuant to this Contract.

CONTRACTOR shall inform its employees, agents, and subcontractors of the confidentiality obligations under this Contract and instruct them so as to ensure such obligations are met. If so requested by the CITY, the CONTRACTOR further agrees to require all such individuals and entities performing services pursuant to this Contract to execute a Confidentiality and Non-Disclosure Agreement in a form acceptable to CITY.

This Section shall survive for six (6) years after the termination or expiration of this Contract. CITY is required to provide notice of the Rules to all entities that receive confidential or otherwise protected personal information of CITY's customers. Italicized words in this Section refer to defined terms contained in the Red Flags Rules published by the Federal Trade Commission in Title 16 Code of Federal Regulations, Part 681 (the "Rules "). CONTRACTOR is, as to Covered Accounts of CITY for which CONTRACTOR performs activities under the Contract, a Service Provider. Service Provider will perform in accordance with its reasonable policies and procedures designed to detect, prevent, and mitigate the risk of identity theft and will promptly report to CITY any specific Red Flag incidents detected as to Covered Accounts of CITY and upon request by CITY will respond to or reasonably assist CITY in responding reported Red Flags. This Section shall survive for six (6) years after the termination or expiration of this Contract.

32. Approval for Release of Information Related to Contract

If requested by CITY, CONTRACTOR shall not release any information or documentation concerning the work under this Contract or any part thereof for marketing, advertising, or other commercial activities or publication including, but not limited to, news releases or professional articles without CITY's prior written approval. CONTRACTOR may submit at any time for review and approval a generic abstract describing the component parts of the completed Scope of Services ("Project Abstract") . After receiving written approval of the Project Abstract from the CITY, the CONTRACTOR may make minor insignificant changes to the Project Abstract and use all or parts of the Project Abstract in proposals.

This Section shall survive for six (6) years after the termination or expiration of this Contract.

33. Dispute Resolution

In the event of a dispute pertaining to this Contract, the parties agree to attempt to negotiate in good faith an acceptable resolution. If a resolution cannot be negotiated, then the parties agree to submit the dispute to voluntary non-binding mediation before pursuing other remedies. This provision does not limit the CITY'S right to terminate authorized by this Contract.

34. Miscellaneous Provisions

Governing Law and Venue.

Washington law shall govern the interpretation of this Contract. Pierce County shall be the venue of any mediation, arbitration or litigation arising out of this Contract.

Assignment.

The CONTRACTOR shall not assign, subcontract, delegate, or transfer any obligation, interest or claim to or under this Contract or for any of the compensation due hereunder without the prior written consent of the CITY.

No Third Party Beneficiaries.

This Contract shall be for the sole benefit of the parties hereto, and nothing contained herein shall create a contractual relationship with, or create a cause of action in favor of, a third party against either party hereto.

Waiver.

A waiver or failure by either party to enforce any provision of this Contract shall not be construed as a continuing waiver of such provisions, nor shall the same constitute a waiver of any other provision of this Contract.

Severability and Survival.

If any term, condition or provision of this Contract is declared void or unenforceable or limited in its application or effect, such event shall not affect any other provisions hereof and all other provisions shall remain fully enforceable. The provisions of this Contract, which by their sense and context are reasonably intended to survive the completion, expiration or cancellation of this Contract, shall survive termination of this Contract.

Entire Agreement.

This Contract and the attached Exhibits, as modified herein, contain the entire agreement between the parties as to the services to be rendered hereunder. All previous and contemporaneous agreements, representations or promises and conditions relating to the subject matter of this Contract are superseded hereby. The Parties hereto mutually acknowledge, understand and agree that the terms and conditions set forth herein shall control and prevail over any conflicting terms and conditions stated in any attachments hereto.

Modification.

No modification or amendment of this Agreement shall be effective unless set forth in writing and signed by the Parties.

Authority to enter into this Contract.

The undersigned Contractor representative, by his/her signature below, represents and warrants that he/she is duly authorized to execute this legally binding Contract for and on behalf of Contractor.

For service contracts valued $25,000 or less the City signature authorizes waiver of competitive solicitation by “Direct Solicitation and Negotiation” of professional and personal services in accordance with Tacoma Municipal Code 1.06.256 and the Purchasing Policy Manual..

IN WITNESS WHEREOF, the Parties hereto have accepted and executed this Contract, as of the Effective Date stated above, which shall be Effective Date for bonding purposes as applicable. The undersigned Contractor representative, by signature below, represents and warrants they are duly authorized to execute this legally binding Contract for and on behalf of Contractor.

CITY OF TACOMA:	CONTRACTOR:
By:	By:

I. GENERAL REQUIREMENTS

A. The City of Tacoma (the City) reserves the right to approve or reject the insurance provided based upon the insurer (including financial condition), terms and coverage, the Certificate of Insurance (COI), and/or endorsements. The insurance must be provided by an insurer with a rating of (A-) VII or higher in the A.M. Best's Key Rating Guide *(http://www.ambest.com/home/default.aspx)*, and pursuant to RCW 48, licensed to do business in the State of Washington (or issued as a surplus line by a Washington Surplus Lines broker).

B. The Contractor shall keep this insurance in force during the entire term of the Contract and for thirty (30) calendar days after completion of all work required by the Contract, unless otherwise provided herein.

C. The liability insurance policies required by this section shall:
   1. Contain a "severability of insureds," "separation of interest," or "cross liability" provision.
   2. Be primary and non-contributory insurance to any insurance coverage or self-insurance program the City may maintain.
   3. Contain a Waiver of Subrogation clause in favor of the City.
   4. Other than Professional Liability, reflect coverage on an “occurrence,” not “claims-made” policy form.

D. The Contractor shall provide the City notice of any cancellation or non-renewal of this required insurance within 30 calendar days.

E. The Contractor shall forward to the City, a full and certified copy of the insurance policy(s) including endorsements required by this section upon the City’s request.

F. The Contractor shall not begin work under the Contract until the required insurance has been obtained and approved by the City.

G. Failure on the part of the Contractor to obtain and maintain the insurance as required by this section shall constitute a material breach of the Contract, upon which the City may, after giving five (5) business day notice to the Contractor to correct the breach, immediately terminate the Contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith; with any sums so expended to be repaid to the City by the Contractor upon demand, or at the sole discretion of the City, offset against funds due the Contractor from the City.

H. All costs for insurance shall be incidental to and included in the unit or lump sum prices of the Contract and no additional payment will be made by the City to the Contractor.

I. For all liability insurance policies required by this Section, the City, including its officers, elected officials, employees, agents, and authorized volunteers, and any other entities as required by the Contract, shall be named as additional insured(s) by amendatory endorsement, EXCEPT Professional Liability (if applicable), Workers’ Compensation, Owners and Contractors Protective Liability, and Railroad Protective Liability.

II. EVIDENCE OF INSURANCE

The Contractor shall deliver a COI and endorsements for each policy of insurance meeting the requirements set forth herein when the Contractor delivers the signed Contract for the work to the City. The certificate and endorsements must conform to the following requirements:

A. An ACORD certificate or a form determined by the City to be equivalent.
B. Copies of all endorsements showing the policy number and naming the City as an additional insured.
C. The endorsement is to state that the insurance is primary and non-contributory over any City insurance or self-insurance.
D. The endorsement is to extend "Products/Completed Operations" coverage to the City as an additional insured.
E. A statement of additional insured status on an ACORD COI shall not satisfy this requirement.
F. Any other amendatory endorsements to show the coverage required herein.

III. CERTIFICATE REQUIREMENTS SPECIFIC REPRESENTATIONS

The following must be indicated on the COI:

A. The City is named as an additional insured *(*"with respect to a specific Contract" or "for any and all work performed with the City" may be included in this statement).
B. "This insurance is primary and non-contributory over any insurance or self-insurance the City may carry" ("with respect to a specific Contract" or "for any and all work performed with the City" may be included in this statement).
C. A Waiver of Subrogation in favor of the City for General Liability and Automobile Liability.
D. Self-Insured Retention and applicable deductible limits must be disclosed on the COI and be no more than Ten Thousand Dollars ($10,000).
E. Contract or Permit number and the City Department.
F. All coverage other than Professional Liability, Cyber/Privacy and Security, and Pollution Liability must be written on "occurrence" form and not "claims-made" form.
G. Reflect the existence and form numbers of all required endorsements.

IV. SUBCONTRACTORS

It is the Contractor's responsibility to ensure that each subcontractor obtain and maintain adequate liability insurance coverage. The Contractor shall provide evidence of such insurance upon the City's request.

V. CERTIFICATE REQUIREMENTS FOR COVERAGES AND LIMITS

The insurance shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve the Contractor from liability in excess of such limits. The policies and/or coverages required by this section shall be subject to a deductible or self-insured retained limit up to Ten Thousand Dollars ($10,000) unless first approved in writing by the City of Tacoma, Risk Management Division.

A. General Liability Insurance

1. Commercial General Liability (CGL) Insurance

The CGL insurance policy must provide limits not less than One Million Dollars ($1,000,000) each occurrence and Two Million Dollars ($2,000,000) annual aggregate.

The CGL policy shall be written on an "occurrence," not "claims-made," basis and shall include the following coverage:

a. Must use (Insurance Services Office (ISO) form CG0001(04-13) or its equivalent).
b. A per project aggregate policy limit.
c. Products Hazard/Completed Operations- for a period of one year following final acceptance of the work.
d. Personal/Advertising Injury.
e. Contractual Liability.
f. Explosion, Collapse, or Underground Property Damage.
g. Blasting (only required when the Contractor's work under this Contract includes exposures to which this specified coverage responds).
h. If Contractor is performing work within fifty (50) feet of a railroad right of way, the General Liability policy shall be endorsed to eliminate the Contractual Liability exclusion pertaining to work within fifty (50) feet of a railroad right of way using ISO form CG2417(10-01) or equivalent.
i. Abuse and Molestation, by a separate coverage part or an endorsement to the CGL, with limits not less than One Million Dollars ($1,000,000) each occurrence and Two Million Dollars ($2,000,000) aggregate including but not limited to Contractors working directly with youth under the age of 18. If Abuse and Molestation coverage is provided on a “claims-made” basis, coverage must be maintained for not less than three years following the end of the contract. This may be done by policy renewals or an Extended Reporting Period Endorsement.
j. Include the City as additional insured and:
    1) Use ISO forms CG2010(04-13) and CG2037(04-13) or equivalent for Contractors performing work on behalf of the City and name the City as an additional insured for ongoing and completed operations.
    2) Use ISO form CG2012(04-13) or equivalent for Permits and name the City as an additional insured.
    3) Use ISO form CG2026(04-13) or equivalent for Facility Use Agreements and name the City as an additional insured.
    4) Blanket additional insured provisions within a policy form will not be accepted in lieu of the specific additional insured endorsement forms specified herein. However, a blanket additional insured endorsement providing the equivalent coverage provided by specific additional insured endorsements specified herein, may be accepted upon written approval from City of Tacoma, Risk Management Division.

B. Commercial Automobile Liability (CAL) Insurance

The Contractor shall obtain and keep in force during the term of the Contract, a policy of CAL insurance coverage, providing bodily injury coverage and property damage coverage for owned (if any), non-owned, hired, and leased vehicles.

The Contractor must also maintain an MCS 90 endorsement or equivalent and a CA 9948 endorsement or equivalent if "Pollutants" are to be transported. CAL policies must provide limits not less than One Million Dollars ($1,000,000) each accident for bodily injury and property damage.
Must use ISO form CA 0001 or equivalent.

C. Workers' Compensation

1. **State of Washington Workers' Compensation**
   The Contractor shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the State of Washington.

D. Employers' Liability (EL) (Stop-Gap) Insurance

The Contractor shall maintain EL coverage with limits not less than One Million Dollars ($1,000,000) each employee, One Million Dollars ($1,000,000) each accident, and One Million Dollars ($1,000,000) policy limit.

E. Professional Liability Insurance (PLI)

The Contractor and/or its subcontractor shall provide evidence of PLI covering professional errors and omissions. Such policy must provide minimum limits of One Million Dollars ($1,000,000) per claim and Two Million Dollars ($2,000,000) aggregate. If the scope of such design-related professional services includes work related to pollution conditions, the PLI policy shall include Pollution Liability coverage. If provided on a "claims-made" basis, such coverage shall be maintained by policy renewals or an extended reporting period endorsement for not less than three years following the end of the Contract.

F. Excess or Umbrella Liability (UL) Insurance

The Contractor shall provide Excess or UL coverage at limits of not less than Five Million Dollars ($5,000,000) per occurrence and in the aggregate. This Excess or UL coverage shall apply, at a minimum, to the CGL, EL and Automobile Liability forms required herein.

G. Cyber/Privacy and Security (CP&S) Insurance

The Contractor shall maintain CP&S insurance with coverage of not less than One Million Dollars ($1,000,000) per claim and Two Million Dollars ($2,000,000) general

aggregate that includes, but is not limited to, coverage for first party costs and third-party claims from:

1. Failure to protect data, including unauthorized disclosure, use or access,
2. Security failure or privacy breach,
3. Failure to disclose such breaches as required by law, regulation, or contract,
4. Notifications, public relations, credit monitoring, postage, advertising, and other services to assist public relations, credit monitoring, postage, advertising, and other services to assist in managing and mitigating a cyber-incident,
5. Interruptions of business operations,
6. Network security failure,
7. Cyber-extortion,
8. Cyber-terrorism,
9. Communications liability (e.g., infringement of copyrights, title, slogan, trademark, trade name, trade dress, service mark or service name in the policy holders covered material), and
10. Other cyber-liability and cyber-crime expenses.

H. Other Insurance

Other insurance may be deemed appropriate to cover risks and exposures related to the scope of work or changes to the scope of work required by the City. The costs of such necessary and appropriate insurance coverage shall be borne by the Contractor.

VI. CONTRACTOR

As used herein, "Contractor" shall be the Supplier(s) entering a Contract with City, whether designated as a Supplier, Contractor, Vendor, Proposer, Bidder, Respondent, Seller, Merchant, Service Provider, or otherwise.

APPENDIX C

Standard Terms and Conditions

Small Business Enterprise (SBE) Program

CITY OF TACOMA
STANDARD TERMS AND CONDITIONS
GOVERNS BOTH GOODS AND SERVICES AS APPLICABLE

In the event of an award by the City, these Terms and Conditions stated herein, Additional Contract Documents if issued, Solicitation if issued, Purchase Orders if issued by City, and Supplier's Submittal, if provided, shall constitute the Contract between City and Supplier for the acquisition of goods, including materials, supplies, and equipment or for the provision of services and deliverables.

Said documents represent the entire Contract between the parties and supersede any prior oral statements, discussions, or understandings between the parties, and/or subsequent Supplier invoices. No modification of the Contract shall be effective unless mutually agreed in writing.

The specific terms and conditions of any Solicitation (Specification, Request for Bids, Request for Proposals, Requests for Qualifications, Requests for Quotations, Request for Information, bid documents, request to enter into negotiations, or other form of solicitation issued by City, including any general, special, or technical provisions associated with such Solicitations) are incorporated herein by reference and supersede these Terms and Conditions where there is conflict or inconsistency.

In the event Additional Contract Documents are negotiated and agreed to in writing between Supplier and City, the specific terms of such Additional Contract Documents are incorporated herein by reference and supersede all other terms and conditions where there is conflict or inconsistency.

These Terms and Conditions, Additional Contract Documents if issued, Solicitation if issued, City purchase order if issued, are controlling over Supplier's Submittal if a Submittal is provided. Submittals if provided are incorporated herein by reference.

1.01 SUPPLIER / CONTRACTOR

As used herein, "Supplier" or "Contractor" shall be the Supplier(s) entering a Contract with City, whether designated as a Supplier, Contractor, Vendor, Proposer, Bidder, Respondent, Seller, Merchant, Service Provider, or otherwise.

1.02 SUBMITTAL

Submittal means Bids, Proposals, Quotes, Qualifications or other information, content, records or documents submitted in response to a City Solicitation.

1.03 FORMS OF SUBMITTAL

Unless stated otherwise, all submittals must be in SAP Ariba and submitted exactly as specified or directed, and all required forms must be used.

1.04 COSTS TO PREPARE SUBMITTAL

The City is not liable for any costs incurred by Supplier for the preparation of materials or a Submittal provided in response to a solicitation, conducting presentations to the City, or any other activities related to responding to the City's Solicitation.

1.05 LICENSES/PERMITS

A. Suppliers must have a Washington state business license at the time of Submittal and throughout the term of the Contract. Failure to include a Washington state business license may be grounds for rejection of the Submittal. Information regarding Washington state business licenses may be obtained at http://bls.dor.wa.gov.

B. Upon award, it is the responsibility of the Supplier to register with the City of Tacoma's Tax and License Division, 733 South Market Street, Room 21, Tacoma, WA 98402-3768, 253-591-5252, https://www.cityoftacoma.org/government/city_departments/finance/tax_and_license/. Supplier shall obtain a business license as is required by Tacoma Municipal Code Subtitle 6C.20.

C. During the term of the Contract, Supplier, at its expense, shall obtain and keep in force any and all necessary licenses and permits.

1.06 PUBLIC DISCLOSURE: PROPRIETARY OR CONFIDENTIAL INFORMATION

A. Supplier Submittals, all documents and records comprising the Contract, and all other documents and records provided to the City by Supplier are deemed public records subject to disclosure under the Washington State Public Records Act, Chapter 42.56 RCW (Public Records Act). Thus, City may be required, upon request, to disclose the Contract and documents or records related to it unless an exemption under the Public Records Act or other laws applies. In the event CITY receives a request for such disclosure, determines in its legal judgment that no applicable exemption to disclosure applies, and Supplier has complied with the requirements to mark records considered confidential or proprietary as such requirements are stated below, City agrees to provide Supplier 10 days written notice of impending release. Should legal action thereafter be initiated by Supplier to enjoin or otherwise prevent such release, all expense of any such litigation shall be borne by Supplier, including any damages, attorneys' fees or costs awarded by reason of having opposed disclosure. City shall not be liable for any release where notice was provided and Supplier took no action to oppose the release of information.

B. If Supplier provides City with records or information that Supplier considers confidential or proprietary, Supplier must mark all applicable pages or sections of said record(s) as "Confidential" or "Proprietary." Further, in the case of records or information submitted in response to a Request for Proposals, an index must be provided indicating the affected pages or sections and locations of all such material identified Confidential or Proprietary. Information not included in the required index will not be reviewed for confidentiality or as proprietary before release. If Supplier fails to so mark or index Submittals and related records, then the City, upon request, may release said record(s) without the need to satisfy the requirements of subsection A above; and Supplier expressly waives its right to allege any kind of civil action or claim against the City pertaining to the release of said record(s).

C. Submission of materials in response to City's Solicitation shall constitute assent by Supplier to the foregoing procedure and Supplier shall have no claim against the City on account of actions taken pursuant to such procedure.

1.07 SUSTAINABILITY

A. The City has interest in measures used by its contractors to ensure sustainable operations with minimal adverse impact on the environment. The City seeks to do business with vendors that value community and environmental stewardship that help us meet our sustainable purchasing goals.

B. The City encourages the use of environmentally preferable products or services that help to minimize the environmental and human health impacts of City operations. Suppliers are encouraged to incorporate environmentally preferable products or services into Submittals wherever possible. "Environmentally preferable" means products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

C. Environmental Standards. The City seeks to ensure that all purchases comply with current environmental standards and product specifications. Where appropriate, third party independent certifiers such as Green Seal and USEPA Standards shall be a minimum specification for products to the City, unless specified otherwise herein.

D. The City encourages the use of sustainability practices and desires any awarded Suppliers to assist in efforts to address such factors when feasible for:

1. Pollutant releases
2. Toxicity of materials used
3. Waste generation
4. Greenhouse gas emissions, including transportation of materials and services
5. Recycle content
6. Energy consumption
7. Depletion of natural resources
8. Potential impact on human health and the environment

1.08 ALTERATIONS NOT ALLOWED

Except as otherwise specifically provided in a Solicitation, Submittals that are incomplete or conditioned in any way, contain erasures, alternatives or items not called for, or not in conformity with law, may be rejected as being non-responsive. Any attempt to condition a Submittal by inserting exceptions to the Solicitation or any conditions, qualifications or additions that vary its terms may result in rejection of the Submittal. The City may reject any submittal containing a material deviation from the Solicitation.

1.09 CORRECTION OF AMBIGUITIES AND OBVIOUS ERRORS

A. The City reserves the right to correct obvious errors in Supplier's Submittal. In this regard, if the unit price does not compute to the extended total price, the unit price shall govern.

B. Supplier shall notify the City of Tacoma Procurement and Payables Division in writing of any ambiguity, conflict, discrepancy, omission or other error in a Solicitation no later than five business days prior to the submittal deadline.

   1. For solicitations conducted in SAP Ariba, Supplier shall notify the City of Tacoma Procurement and Payables Division on the message board of the event.

   2. For all other solicitations, Supplier shall notify the contract person listed in the Solicitation.

C. The City will make necessary modifications by addendum.

D. Supplier is responsible for identifying ambiguities, conflicts, discrepancies, omissions or other errors in the Solicitation prior to providing its Submittal or the ambiguity, conflict, discrepancy, omission, or other error is waived. Any Submittal that includes assumed clarifications and/or corrections without the required authentication of the same is subject to rejection.

1.10 WARRANTIES/GUARANTEE

A. Suppliers warrant that all items, including services, as applicable:

   1. Are merchantable.

   2. Comply with the City's latest drawings and specifications.

   3. Are fit for the City's intended use.

   4. Will be performed according to the skill and care required by customarily accepted good practices and procedures followed by service providers rendering the same or similar type of service.

   5. Are new and unused unless otherwise stated.

   6. Comply with all applicable safety and health standards established for such products by the Occupational Safety and Health Administration (OSHA), Washington Industrial Safety and Health Act (WISHA) and/or Consumer Products Safety Act (CPSA), and all other applicable state and federal laws or agency regulations.

   7. Are properly packaged and contain appropriate instructions or warnings, including applicable MSDS sheets.

1.11 PATENTS, TRADEMARKS AND COPYRIGHTS

Suppliers warrant that equipment and/or materials furnished, including software, do not infringe on any patent, trademark or copyright, and agree to indemnify, defend and hold harmless, the City in the event of any infringement or claim thereof.

1.12 DELIVERY OF SUBMITTALS TO THE CITY'S PROCUREMENT AND PAYABLES DIVISION

A. Submittal packages must be received by the City's Procurement and Payables Division in SAP Ariba (unless another form of delivery is stated), prior to the scheduled time and date stated in the Solicitation.

B. Supplier is solely responsible for timely delivery of its Submittal.

C. Submittals received after the time stated in the solicitation will not be accepted.

D. For purposes of determining whether a Submittal has been timely received in SAP Ariba, the City's Procurement and Payables Division will rely on the submittal clock in SAP Ariba.

1.13 SUBMITTAL IS NON-COLLUSIVE

Supplier acknowledges that by its delivery of a Submittal to the City in response to a Solicitation, it represents that the prices in such Submittal are neither directly nor indirectly the result of any formal or informal agreement with another Supplier.

1.14 PARTNERSHIPS

The City will allow firms to partner in order to respond to a Solicitation. Multiple suppliers may team under a Prime Supplier's Submittal in order to provide responses to all sections in a single submission; however, each Supplier's participation must be clearly delineated by section. The Prime Supplier will be considered the responding vendor and the responsible party at contract award. All contract negotiations will be conducted only with the Prime Supplier. All contract payments will be made only to the Prime Supplier. Any agreements between the Prime Supplier and other companies will not be a part of the Contract between the City and the Prime Supplier. The City reserves the right to select more than one Prime Supplier.

1.15 WITHDRAWAL OF SUBMITTALS

A. Prior to Submittal Deadline. Submittals may be withdrawn (including in SAP Ariba) prior to the scheduled submittal deadline.

B. After Submittal Deadline. No Submittal can be withdrawn after having been opened before the actual award of the contract, unless the award is delayed more than 90 calendar days beyond the date of opening. If a delay of more than 90 calendar days does occur, Supplier must submit written notice to the City purchasing manager that Supplier is withdrawing its submittal.

1.16 ACCEPTANCE OF SUBMITTALS

A. If the solicitation announcement so states, submittals, unless previously withdrawn, will be read aloud, irrespective of any irregularities or informalities in such submittal, at the time and place specified in the solicitation announcement.

B. All submittals must remain open for acceptance by the City for a period of at least 90 calendar days from the submittal deadline.

1.17 RIGHT TO REJECT

A. The City of Tacoma reserves the right to reject any and all submittals, waive minor deviations or informalities, supplement, amend, reduce or otherwise modify the scope of work or cancel the solicitation, and if necessary, call for new submittals.

1.18 RESERVED RIGHTS

A. By providing a submittal in response to a City solicitation, Supplier acknowledges and consents to the below City rights and conditions. With regard to this procurement process, the City reserves, holds without limitation, and may exercise, at its sole discretion, the following rights and conditions:

1. To terminate the procurement process or decide not to award a contract as a result thereof by written notice to the Suppliers for any reason whatsoever with or without substitution of another solicitation.

2. To waive any defect, technicality, or any other minor informality or irregularity in any submittal, or any other response from Suppliers.

3. To issue addenda for any purpose including:

    a. To make minor or major changes or alterations to the evaluation, selection and/or performance schedule(s) for any events associated with a procurement.

    b. To supplement, amend, reduce, cancel, or otherwise modify a Solicitation, including but not limited to modifications to the description of services and/or products contained in the solicitation, by omitting services/products and/or including services/products.

4. To request clarifications, additional information, and/or revised Submittals from one or more Suppliers.

5. To conduct investigations with respect to the qualifications and experience of Supplier(s), including inspection of facilities and to request additional evidence to support any such information.

6. To eliminate any Supplier that submits an incomplete or inadequate response, or is non-responsive to the requirements of a Solicitation, or is otherwise deemed to be unqualified during any stage of the procurement process.

7. To select and interview a single finalist or multiple finalists to further the City's evaluation of Submittals provided in response to a Solicitation. The City may, in its sole and exclusive discretion as to what is in the City's best interest, elect not to conduct interviews of any or all Suppliers in connection with a solicitation process.

8. Except in the case of Requests for Bids, to negotiate any rate/fee offered by a Supplier. The City shall have the sole right to make the final rate/fee offer during contract negotiations. If the selected Supplier does not accept the City's final offer, the City may, in its sole discretion discontinue contract negotiations and commence negotiations with another Supplier, except as otherwise provided in Chapter 39.80, RCW.

9. To select and enter into a Contract with one or more Suppliers whose Submittal best satisfies the interests of the City and is most responsive, in the sole judgment of the City, to the requirements of a Solicitation.

10. To award by line item or group of line items.

11. To not award one or more items.

12. To issue additional or subsequent solicitations.

13. To seek partnerships between one or more Suppliers.

14. Request additional related products and services from the selected Supplier(s) as necessary throughout the term of the Contract.

15. Negotiate costs or fees in the event of new legislation or regulatory changes, or issuance of related compliance guidance, technology enhancements, and innovative solutions.

16. In the event the City receives questions concerning a Solicitation from one or more Suppliers prior to the deadline for response, the City reserves the right to provide such questions, and the City's responses, if any, to all Suppliers.

17. If an award is made and, prior to entering into a contract, subsequent information indicates that such award is not in the best interest of the City, the City may rescind the award without prior notice to Supplier and either award to another Supplier or reject all submittals or cancel this solicitation.

18. To cancel award of a contract at any time before execution of the Contract by both parties if cancellation is deemed to be in the City's best interest. In providing a submittal, Suppliers agree that the City is not liable for any costs or damages for the cancellation of an award. Supplier assumes the sole risk and responsibility for all expenses connected with the preparation of its submittal.

19. To add additional City departments or divisions to the Contract or develop a separate Contract with the Supplier subject to all terms, conditions and pricing of the original Contract

20. To take any other action affecting a Solicitation or a procurement process that is determined to be in the City's best interests.

1.19 SUBMITTAL CLARIFICATION

Suppliers may be asked to clarify their Submittal. This action shall not be construed as negotiations or any indication of intentions to award. If called upon, Supplier must respond to such requests within two business days or the timeframe set forth by the City in its request for clarification. Supplier's failure to respond to such a request may result in rejection of its Submittal.

1.20 EVALUATION OF SUBMITTALS

A. The City of Tacoma reserves the right to award to the lowest and best responsible Supplier(s) delivering a Submittal in compliance with the Solicitation, provided such Submittals are reasonable and are in the best interest of the City to accept. The City may use a number of criteria for determining award, including evaluation factors set forth in Municipal Code Section 1.06.262. Suppliers who are inexperienced or who fail to properly perform other contracts may have their submittal rejected for such cause.

1. Evaluation Factors. In addition to the factors set forth in Municipal Code Section 1.06.262, the following may be used by the City in determining the lowest and best responsible Submittal:

    a. Compliance with a Solicitation and with applicable City requirements, including by not limited to, the City's Ethics Code and its Small Business Enterprise and Local Employment and Apprenticeship programs.
    b. Submittal prices, listed separately if requested, as well as a lump sum total (if the unit price does not compute to the extended total price, the unit price shall govern).
    c. The total cost to the City, including all applicable taxes, may be the basis for contract award.
    d. Time of delivery and/or completion of performance (delivery date(s) offered).
    e. Warranty terms.
    f. Quality of performance of previous contracts or services, including safety requirements and past compliance with the City's Ethics Code.
    g. Previous and existing compliance with laws and ordinances relating to contracts or services.
    h. Sufficiency of financial resources.
    i. Quality, availability, and adaptability of the supplies or services to the particular use required.
    j. Ability to provide future maintenance and service on a timely basis.
    k. Location of nearest factory authorized warranty repair facility or parts dealership.
    l. Ability, capacity, experience, stability, reputation, integrity, character, judgment, technical qualifications, and skill to perform the contract or provide the services required.

2. Cash Discount. Payment discount periods of 20 calendar days or more, if offered in the submittal, will be considered in determining the apparent lowest responsible submittal. Discounts will be analyzed in context of their overall cumulative effect.

3. All other elements or factors, whether or not specifically provided for in a Solicitation, which would affect the final cost to, and the benefits to be derived by, the City, may be considered in determining the award of a Contract. The final award decision will be based on the best interests of the City.

1.21 CONTRACT OBLIGATION

A. The Submittal contents of the successful Supplier will become contractual obligations if a Contract ensues.

B. In the event the City of Tacoma determines to award a Contract, the selected Supplier(s) may be requested to execute Additional Contract Documents.

C. Supplier shall register with the City of Tacoma on the SAP Ariba Network and be enabled for transactions upon request by the City.

D. Suppliers may propose amendments to City's Contract documents or to these Terms and Conditions, but the City retains the right to accept or reject proposed amendments.

E. No costs chargeable for work under the proposed Contract may be incurred before mutual acceptance and execution as directed.

1.22 AWARD

The City reserves the right to award Contracts for any or all items to one or more Suppliers in the best interests of the City.

1.23 SUPPLIER'S REFUSAL TO ENTER INTO CONTRACT

Any Supplier who refuses to enter into a Contract after it has been awarded to the Supplier will be in breach of the agreement to enter the Contract, and Supplier's certified or cashier's check or bid bond, if any, shall be forfeited.

1.24 LEGAL HOLIDAYS

A. The City of Tacoma observes the following holidays, which shall apply to performance of all contracts:

New Year's Day	January 1
Martin Luther King's Birthday	3rd Monday in January
Washington's Birthday	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4
Labor Day	1st Monday in September

Veteran's Day	November 11
Thanksgiving Day	4th Thursday of November
Day after Thanksgiving	4th Friday of November
Christmas Day	December 25

B. When any of these holidays occur on Saturday or Sunday, the preceding Friday or the following Monday, respectively, is a legal holiday for the City of Tacoma.

1.25 CONTRACT TERM

All services shall be satisfactorily completed and all deliverables provided by the termination date stated, and the Contract shall expire on said date unless mutually extended in writing by the parties.

1.26 EXTENSION OF CONTRACT

Contracts shall be subject to extension at City's sole discretion.

1.27 TERMINATION AND SUSPENSION

A. Supplies. The City reserves the right to terminate a Contract at any time upon prior written notice to Supplier. Upon the effective date of termination specified in such notice, and payment by the City, all conforming supplies, materials, or equipment previously furnished hereunder shall become its property.

B. Services. The City may terminate a Contract at any time, with or without cause, by giving 10 business days written notice to Supplier. In the event of termination, all finished and unfinished work prepared by Supplier pursuant to the Contract shall be provided to the City. In the event City terminates the Contract due to the City's own reasons and without cause due to Supplier's actions or omissions, the City shall pay Supplier the amount due for actual work and services necessarily performed under the Contract up to the effective date of termination, not to exceed the total compensation set forth in the Contract.

C. Suspension. For either services or supplies, the City may suspend a Contract, at its sole discretion, upon three business days' written notice to Supplier. Such notice shall indicate the anticipated period of suspension. Any reimbursement for expenses incurred due to the suspension shall be limited to Supplier's actual expenses and shall be subject to verification. Supplier shall resume performance of services under the Contract without delay when the suspension period ends.

D. Termination or suspension of a Contract by City shall not constitute a waiver of any claims or remaining rights the City may have against Supplier relative to performance under a Contract.

1.28 DEFAULT/BREACH

In the event of material default or breach by Supplier on any of the conditions of a Contract, Supplier agrees that the City may, at its election, procure the goods or services from other sources, and may deduct from the unpaid balance due Supplier, or collect against the bond or security (if any), or may invoice and recover from Supplier all costs paid in excess of the price(s) set forth in the Contract. **CHANGES**

A. Supplies. The City at any time by written change order or other form of written contract amendment may make reasonable changes in the place of delivery, installation, or inspection, the method of shipment or packing, identification and ancillary matters that Supplier may accommodate without substantial additional expense.

B. Services. The City shall have the right to make changes within the general scope of services and/or deliverables upon execution in writing of a change order or other written form of contract amendment. If the changes will result in additional work effort by Supplier the City agrees to reasonably compensate Supplier for such additional effort up to the maximum amount specified in the Contract or as otherwise provided by Tacoma Municipal Code. Any new services accepted by the City may be added to the Contract and/or substituted for discontinued services. New services shall meet or exceed all requirements of original award.

C. Expansion Clause. A Contract may be further expanded in writing to include other related services or products normally offered by Supplier, as long as the price of such additional services or products have a profit margin equal to or less than that in place at the time of original submittal. Such additions and prices will be established in writing. New items not meeting these criteria will not be added to the Contract. Supplier profit margins are not to increase as a result any such expansion.

1.29 SCOPE OF SERVICES

Supplier agrees to diligently and completely perform the services required by a Contract.

1.30 SERVICES DO NOT INCLUDE PUBLIC WORK

Unless otherwise stated, the services and/or work contracted for herein exclude public work and improvements as defined in RCW 39.04, as that statute may hereafter be amended.

1.31 PREVAILING WAGES

A. If federal, state, local, or any applicable law requires Supplier to pay prevailing wages in connection with a Contract, and Supplier is so notified by the City, then Supplier shall pay applicable prevailing wages.

B. If applicable, a Schedule of Prevailing Wage Rates for the locality or localities where the Contract will be performed is attached and made of part of the Contract by this reference. If prevailing wages do apply to the Contract, Supplier and its subcontractors shall:

1. Be bound by the provisions of Chapter 39.12 RCW, as amended, relating to prevailing wages and usual fringe benefits,

2. Ensure that no worker, laborer or mechanic employed in the performance of any part of the Contract shall be paid less than the prevailing rate of wage specified on that Schedule, and

3. Immediately upon award of the Contract, contact the Department of Labor and Industries, Prevailing Wages section, Olympia, Washington, to obtain full information, forms and procedures relating to these matters. Per such procedures, a Statement of Intent to Pay Prevailing Wages must be submitted by Contractor and its subcontractors to the City, in the manner requested by the City, prior to any payment by the City hereunder, and an Affidavit of Wages Paid must be received or verified by the City prior to final Contract payment.

1.32 CONTRACT PRICING

A. Submitted prices shall include costs of submittal preparation, servicing of the account, all contractual requirements during contract period such as transportation, permits, insurance costs, bonds, labor, wages, materials, tools, components, equipment, and appurtenances necessary to complete the work, which shall conform to the best practice known to the trade in design, quality, material, and workmanship.

B. Surcharges of any type will not be paid.

C. If applicable, related additional products and corresponding services of benefit to the City not specifically required in a solicitation, but which Supplier offers to provide, may be included with the submittal. Supplier may request to add new products if the City approves them and Supplier can demonstrate the pricing is from the same pricing structure/profit margin.

D. Unless specifically stated otherwise, only firm prices will be accepted and all prices shall remain firm during the term of a Contract.

E. Price increases may at City's discretion be passed along during a contract period if the increase is mandated by statute.

F. By submitting prices, Supplier warrants prices equal to or better than the equivalent prices, terms, and benefits offered by Supplier to any other government unit or commercial customer.

G. Should Supplier, during the term of a Contract, enter into any other contract, agreement or arrangement that provides lower prices, more favorable terms or greater benefits to any other government unit or commercial customer, the Contract with the City shall thereupon be deemed amended to provide the same price or prices, terms and benefits to the City. This provision applies to comparable products and purchase volumes by the City that are not less than the purchase volumes of the government unit or commercial customer that has received the lower prices, greater benefits, or more favorable terms.

H. If at any time during the term of the Contract, Supplier reduces prices to other buyers purchasing approximately the same quantities stated on the Contract, Supplier will immediately notify the City purchasing manager of such fact, and the price(s) for future orders under the Contract shall be reduced accordingly.

I. The City is entitled to any promotional pricing during the Contract period.

J. Price decreases shall be immediately passed on to the City.

K. The City reserves the right to increase or decrease the quantities of any item awarded pursuant to the Contract and pay according to the unit prices quoted in the submittal with no adjustments for anticipated profit.

1.33 APPROVED EQUALS WHEN ALTERNATES ARE ALLOWED

A. Unless an item is indicated as "no substitute," special brands, when named, are intended to describe the standard of quality, performance, or use desired. Equal items will be considered by the City, provided that Supplier specifies the brand and model, and provides all descriptive literature, independent test results, specification sheets, schematic drawings, photographs, product samples, local servicing, parts availability, etc., to enable the City to evaluate the proposed equal. Performance testing in the field may be required.

B. The decision of the City as to what items are equal shall be final and conclusive. If the City elects to purchase a brand represented by Supplier to be an "equal," the City's acceptance of the item is conditioned on the City's inspection and testing after receipt. If, in the sole judgment of the City, the item is determined not to be an equal, the item shall be returned at Supplier's expense.

C. When a brand name or level of quality is not stated in Supplier's submittal, it is understood Supplier's submittal shall exactly confirm with those required in the Contract. If more than one brand name is stated in a Solicitation, Supplier(s) must indicate the brand and model/part number to be supplied.

1.34 RISK OF LOSS, SHIPPING AND DELIVERY

A. Shipping. Prices must be quoted FOB destination (the place of destination as defined in RCW 62A.2-319, as that statute may hereafter be amended), with freight prepaid and allowed (shipping costs included in unit prices), and risk of loss remaining with Supplier until delivery is tendered.

B. Delivery. Delivery will be to the designated addresses set forth in a Solicitation or as otherwise stated in the Contract. Deliveries shall be between 9:00 a.m. and 3:30 p.m., Monday through Friday only, except Legal Holidays. Failure to make timely delivery shall be cause for termination of the contract or order and return of all or part of the items at Supplier's expense except in the case of force majeure.

1.35 DELIVERY OF PRODUCTS AND PROVISION OF SERVICES – IDLING PROHIBITED

A. The City of Tacoma has a commitment to reduction of unnecessary fuel emissions and improving air quality by reducing unnecessary air pollution from idling vehicles. Limiting car and truck idling supports cleaner air, healthier work environments, the efficient use of city resources, the public's enjoyment of City properties and programs, conservation of natural resources, and good stewardship practices.

B. Vehicles and/or diesel fuel trucks shall not idle at the time and location of the delivery to the City of Tacoma for more than three minutes. The City requires contractors to utilize practices that reduce fuel consumption and emission discharge, including turning off trucks and vehicles during delivery of products to the City. Exceptions to this requirement include when associated power is necessary to make a delivery or provide the service, when the engine is used to provide power to another device, and when a running engine is required for proper warm-up and cool-down of the engine.

1.36 PACKING SLIPS AND INVOICES

A. Each invoice shall show City of Tacoma purchase order number, release number if applicable, quantity, unit of measure, item description, unit price and extended price for each line if applicable, services and deliverables provided if applicable. Line totals shall be summed to give a grand total to which sales tax shall be added, if applicable.

1. For transactions conducted in SAP Ariba, invoices shall be submitted through Ariba.
2. For invoices paid by ACH or by check, unless stated otherwise, invoices shall be electronically submitted by email with corresponding PO number listed in the subject line to accountspayable@cityoftacoma.org.
3. For invoices paid by credit card, invoices shall also display the last name of the cardholder and last four digits (only) of the card number (e.g., Jones/6311). Unless stated otherwise, invoices shall be electronically submitted by email with corresponding PO number listed in the subject line to (do not combine different POs into one invoice or charge) to pcardadmin@cityoftacoma.org.

B. Any terms, provisions or language in Supplier's invoice(s) that conflict with the terms of the Contract are superseded and shall not apply to the Contract unless expressly accepted in writing by the City.

C. Packing slips and shipping notices shall be sent to the specific City Division or Department receiving the item(s) at the address stated in City's Solicitation or as otherwise stated in the Contract and include complete description of items, contents of items if crated or cased, quantity, shipping point, carrier, bill of lading number and City of Tacoma purchase order.

D. Supplier shall package orders, preferably in environmental friendly packaging such as reduced packaging and recyclable packing materials.

1.37 COOPERATIVE PURCHASING

The Washington State Interlocal Cooperation Act RCW 39.34 provides that other governmental agencies may purchase goods and services based on the Contract with the City in accordance with the terms and prices of the Contract if all parties are agreeable. Each public agency shall formulate a separate contract with Supplier, incorporating the terms and conditions of the Contract with the City of Tacoma. The City shall incur no liability in connection with such contracts or purchases by other public agencies thereunder. It will be Supplier's responsibility to inform such public agencies of the Contract with the City. Supplier shall invoice such public agencies as separate entities.

1.38 TAXES

A. Unless otherwise stated, applicable federal, state, City, and local taxes shall be included in the submittal and in contract as indicated below. As used herein, the term "taxes" shall include any and all taxes, assessments, fees, charges, interest, penalties, and/or fines imposed by applicable laws and regulations in connection with the procurement of goods and/or services hereunder.

1. Federal Excise Tax. The City of Tacoma is exempt from federal excise tax. The City will furnish a Federal Excise Tax Exemption certificate, if required. If Supplier fails to include any applicable tax in its submittal, then Supplier shall be solely responsible for the payment of said tax.

2. State and Local Sales Tax. The City of Tacoma is subject to Washington state sales tax. It is Supplier's obligation to state the correct sales tax percentage and include the applicable Washington state, city and local sales tax as a separate line item(s) in the submittal.

3. City of Tacoma Business and Occupation Tax. It is Supplier's obligation to include City of Tacoma Business and Occupation tax in the unit and/or lump sum prices submitted; it shall not be shown separately on the submittal. Per Sub-Title 6A of the City of Tacoma Municipal Code, transactions with the City of Tacoma may be subject to the City's Business and Occupation Tax.

B. Any or All Other Taxes. Any or all other taxes are the responsibility of Supplier unless otherwise required by law. Except for state sales tax, Supplier acknowledges that it is responsible for the payment of all taxes applicable to the Contract and Supplier agrees to comply with all applicable laws regarding the reporting of income, maintenance of records, and all other requirements and obligations imposed pursuant to applicable law.

C. If the City is assessed, made liable, or responsible in any manner for taxes contrary to the provisions of the Contract, Supplier agrees to hold the City harmless from such costs, including attorney's fees. In the event Supplier fails to pay any taxes, assessments, penalties, or fees imposed by any governmental body, including a court of law, other than those taxes the City is required to pay, then Supplier authorizes the City to deduct and withhold or pay over to the appropriate governmental body those unpaid amounts upon demand by the governmental body. It is agreed that this provision shall apply to taxes and fees imposed by City ordinance. Any such payments shall be deducted from Supplier's total compensation.

1.39 COMPENSATION

A. The City shall compensate Supplier in accordance with the Contract. Said compensation shall be the total compensation for Supplier's performance hereunder including, but not limited to, all work, services, deliverables, materials, supplies, equipment, subcontractor's fees and all reimbursable travel and miscellaneous or incidental expenses to be incurred by Supplier. Unless stated otherwise the total stated compensation may not be changed without a written change order or other form of contract amendment.

B. Payment(s) made in accordance with the Contract shall fully compensate Supplier for all risk, loss, damages or expense of whatever nature, and acceptance of payment shall constitute a waiver of all claims submitted by Supplier.

1.40 PAYMENT TERMS

A. Payment shall be made through the City's ordinary payment process, and shall be considered timely if made within 30 days of receipt of a properly completed invoice. All payments shall be subject to adjustment for any amounts, upon audit or otherwise, determined to have been improperly invoiced. The City may withhold payment to Supplier for any services or deliverables not performed as required hereunder until such time as Supplier modifies such services or deliverables to the satisfaction of the City.

B. Invoices will not be processed for payment, nor will the period of cash discount commence, until all invoiced items are received and satisfactory performance of the Contract has been attained. Upon CITY'S request, Supplier shall submit necessary and appropriate documentation, as determined by the CITY, for all invoiced services and deliverables. If an adjustment in payment is necessary due to damage or dispute, the cash discount period shall commence on the date final approval for payment is authorized.

1.41 PAYMENT METHOD – CREDIT CARD ACCEPTANCE – EFT/ACH ACCEPTANCE

A. Payment methods include:

1. Credit card. Tacoma's VISA procurement card program is supported by standard bank credit suppliers and requires that merchants abide by the VISA merchant operating rules.

   a. Suppliers must be PCI-DSS compliant (secure credit card data management) and federal FACTA (sensitive card data display) compliant.
   b. Suppliers must be set up by their card processing equipment provider (merchant acquirer) as a minimum of a Level II merchant with the ability to pass along tax, shipping and merchant references information.

2. Electronic Funds Transfer (EFT) by Automated Clearing House (ACH).

3. Check or other cash equivalent.

B. The City's preferred method of payment is by Visa credit card (aka procurement card). Suppliers may be required to have the capability of accepting the City's authorized procurement card as a method of payment**. The City of Tacoma will not accept price changes or pay additional fees when the procurement card is used.**

C. The City, in its sole discretion, will determine the method of payment for goods and/or services as part of the Contract.

1.42 NOTICES

Unless otherwise specified, except for routine operational communications, which may be delivered personally or transmitted by electronic mail, all notices required by the Contract shall be in writing and shall be deemed to have been duly given if delivered personally or mailed first-class mail, postage prepaid, to Supplier's registered agent and to the applicable City department representative.

1.43 INDEPENDENT CONTRACTOR STATUS

A. Supplier is considered an independent contractor who shall at all times perform his/her duties and responsibilities and carry out all services as an independent contractor and shall never represent or construe his/her status to be that of an agent or employee of the City, nor shall Supplier be eligible for any employee benefits. No payroll or employment taxes or contributions of any kind shall be withheld or paid by the City with respect to payments to Supplier. Supplier shall be solely responsible for all said payroll or employment taxes and/or contributions including, but not limited to, FICA, FUTA, federal income tax, state personal income tax, state disability insurance tax and state unemployment insurance tax. If the City is assessed, made liable or responsible in any manner for such taxes or contributions, Supplier agrees to indemnify and hold the City harmless from all costs incurred, including attorney fees.

B. Unless otherwise specified in writing, Supplier shall provide at its sole expense all materials, working space, and other necessities and instruments to perform its duties under the Contract. Supplier, at its sole expense, shall obtain and keep in force any and all applicable licenses, permits and tax certificates necessary to perform the Contract.

1.44 NONDISCRIMINATION

Supplier agrees to take all steps necessary to comply with all federal, state, and City laws and policies regarding non-discrimination and equal employment opportunities. Supplier shall not discriminate in any employment action because of race, religion, color, national origin or ancestry, sex, gender identity, sexual orientation, age, marital status, familial status, or the presence of any sensory, mental, or physical handicap. In the event of non-compliance by Supplier with any of the non-discrimination provisions of the Contract, the City shall be deemed to have cause to terminate the Contract, in whole or in part.

1.45 FEDERAL, STATE, AND MUNICIPAL LAWS AND REGULATIONS

Supplier shall comply with all federal, state, municipal, and/or local laws and regulations in the performance of all terms and conditions of the Contract. Supplier shall be solely responsible for all violations of the law from any cause in connection with its performance of work under the Contract.

1.46 REPORTS, RIGHT TO AUDIT, PERSONNEL

A. Reports. Supplier shall, at such times and in such form as the City may reasonably require, furnish the City with periodic status reports pertaining to the services undertaken or goods provided pursuant to the Contract.

B. Right to Audit. Upon City's request, Supplier shall make available to City all accounts, records and documents related to the scope of work for City's inspection, auditing, or evaluation during normal business hours as reasonably needed by City to assess performance, compliance and/or quality assurance under the Contract or in satisfaction of City's public disclosure obligations as applicable.

C. Personnel. If before, during, or after the execution of a Contract, Supplier has represented or represents to the City that certain personnel would or will be responsible for performing services pursuant to the Contract, then Supplier is obligated to ensure that said personnel perform said Contract services to the maximum extent permitted by law. Substantial organizational or personnel changes within Supplier's firm are expected to be communicated to City immediately. Failure to do so could result in termination of the Contract. This provision shall only be waived by written authorization by the City, and on a case-by-case basis.

1.47 INSURANCE

During the course and performance of a Contract, Supplier will provide proof and maintain the insurance coverage in the amounts and in the manner specified in the City of Tacoma Insurance Requirements as is applicable to the services, products, and deliverables provided under the Contract. The City of Tacoma Insurance Requirements document, if issued, is fully incorporated into the Contract by reference.

1.48 INDEMNIFICATION – HOLD HARMLESS

A. Supplier agrees to indemnify, defend, and hold harmless the City of Tacoma, its officers, agents and employees, from and against any and all liability which may accrue to or be sustained by the City of Tacoma for any claim, suit or legal action made or brought against the City for the death of or injury to persons (including Supplier's or subcontractor's employees), or damage to property involving Supplier or subcontractor(s) and their employees or agents, or for any other cause arising out of and in connection with or incident to the performance of the Contract, except for injuries or damages caused by the sole negligence of the City. In this regard, Supplier recognizes it is waiving immunity under Industrial Insurance Law, Title 51 RCW. This indemnification includes attorney's fees and the cost of establishing the right to indemnification hereunder in favor of the City of Tacoma. By Supplier's acceptance of this order, he/she agrees that this subsection has been mutually negotiated.

B. These indemnifications shall survive the termination of a Contract.

1.49 CONFLICT OF INTEREST

No officer, employee, or agent of the City, nor any member of the immediate family of any such officer, employee or agent as defined by City ordinance, shall have any personal financial interest, direct or indirect, in a Contract, either in fact or in appearance. Supplier shall comply with all federal, state, and City conflict of interest laws, statutes, and regulations. Supplier represents that Supplier presently has no interest and shall not acquire any interest, direct or indirect, in the program to which the Contract pertains that would conflict in any manner or degree with the performance of Supplier's services and obligations hereunder. Supplier further covenants that, in performance of a Contract, no person having any such interest shall be employed. Supplier also agrees that its violation of the City's Code of Ethics contained in Chapter 1.46 of the Tacoma Municipal Code shall constitute a breach of Contract subjecting the Contract to termination.

1.50 CITY OWNERSHIP OF WORK/RIGHTS IN DATA/PUBLICATIONS

A. To the extent that Supplier creates any work subject to the protections of the Copyright Act (Title 17 U.S.C.) in its performance of a Contract, Supplier agrees to the following: The work has been specially ordered and commissioned by the City. Supplier agrees that the work is a "work made for hire" for copyright purposes, with all copyrights in the work owned by City. To the extent that the work does not qualify as a work made for hire under applicable law, and to the extent that the work includes material subject to copyright, Supplier hereby assigns to City, its successors and assigns, all right, title and interest in and to the work, including but not limited to, all copyrights, patent, trade secret and other

proprietary rights, and all rights, title and interest in and to any inventions and designs embodied in the work or developed during the course of Supplier's creation of the work.

B. Supplier shall be solely responsible for obtaining releases and/or licenses for the reproduction, distribution, creation of derivative works, performance, display, or other use of copyrighted materials. Should Supplier fail to obtain said releases and/or licenses, Supplier shall indemnify, defend, and hold harmless the City for any claim resulting there from.

1.51 DUTY OF CONFIDENTIALITY

Supplier acknowledges that unauthorized disclosure of information or documentation concerning the Scope of Work hereunder may cause substantial economic loss or harm to the City. Except for disclosure of information and documents to Supplier's employees, agents, or subcontractors who have a substantial need to know such information in connection with Supplier's performance of obligations under the Contract, Supplier shall not without prior written authorization by the City allow the release, dissemination, distribution, sharing, or other publication or disclosure of information or documentation obtained, discovered, shared or produced pursuant to a Contract.

1.52 DISPUTE RESOLUTION

In the event of a dispute pertaining to ta Contract, the parties agree to attempt to negotiate in good faith an acceptable resolution. If a resolution cannot be negotiated, then the parties agree to submit the dispute to voluntary non-binding mediation before pursuing other remedies. This provision does not limit the City's right to terminate.

1.53 GOVERNING LAW AND VENUE

Washington law shall govern the interpretation of the Contract. The state or federal courts located in Pierce County Washington shall be the sole venue of any mediation, arbitration, or litigation arising out of the Contract.

1.54 ASSIGNMENT

Supplier shall not assign, subcontract, delegate or transfer any obligation, interest or claim to or under the Contract without the prior written consent of the City.

1.55 WAIVER

A waiver or failure by either party to enforce any provision of the contract shall not be construed as a continuing waiver of such provisions, nor shall the same constitute a waiver of any other provision of the Contract.

1.56 SEVERABILITY AND SURVIVAL

If any term, condition or provision herein or incorporated by reference is declared void or unenforceable or limited in its application or effect, such event shall not affect any other provisions hereof and all other provisions shall remain fully enforceable. The provisions of the Contract, which by their sense and context are reasonably intended to survive the completion, expiration or cancellation of the Contract, shall survive termination of the Contract.

1.57 NO CITY LIABILITY

Neither the City, its officials, staff, agents, employees, representatives, or consultants will be liable for any claims or damages resulting from any aspect of this procurement process.

1.58 SIGNATURES

A signed copy of Submittals, Contract documents, including but not limited to contract amendments, contract exhibits, task orders, statements of work and other such Contract related documents, delivered by email or other means of electronic transmission including by using a third party service, which service is provided primarily for the electronic execution of electronic records, shall be deemed to have the same legal effect as delivery of an original signed copy.

Chapter 1.07

SMALL BUSINESS ENTERPRISE

Sections:

1.07.010 Policy and purpose.
1.07.020 Definitions.
1.07.030 Discrimination prohibited.
1.07.040 Program administration.
1.07.050 Certification.
1.07.060 Program requirements.
1.07.070 Evaluation of submittals.
1.07.080 Contract compliance.
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1.07.100 Enforcement.
1.07.110 Remedies.
1.07.120 Unlawful acts.
1.07.130 Severability.
1.07.140 Sunset and review of program.

1.07.010 Policy and purpose.

It is the policy of the City of Tacoma that citizens be afforded an opportunity for full participation in our free enterprise system and that historically underutilized business enterprises shall have an equitable opportunity to participate in the performance of City contracts. The City finds that in its contracting for supplies, services and public works there has been historical underutilization of small businesses located in certain geographically and economically disfavored locations and that this underutilization has had a deleterious impact on the economic well-being of the City. The purpose of this chapter is to remedy the effects of such underutilization through use of reasonably achievable goals to increase opportunities for historically underutilized businesses to participate in City contracts. It is the goal of this chapter to facilitate a substantial procurement, education, and mentorship program designed to promote equitable participation by historically underutilized businesses in the provision of supplies, services, and public works to the City. It is not the purpose of this chapter to provide any person or entity with any right, privilege, or claim, not shared by the public, generally, and this chapter shall not be construed to do so. This chapter is adopted in accordance with Chapter 35.22 RCW and RCW 49.60.400.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.020 Definitions.

Terms used in this chapter shall have the following meanings unless defined elsewhere in the Tacoma Municipal Code ("TMC"), or unless the context in which they are used clearly indicates a different meaning.

A. "Affidavit of Small Business Enterprise Certification" means the fully completed, signed, and notarized affidavit that must be submitted with an application for SBE certification. Representations and certifications made by the applicant in this Affidavit are made under penalty of perjury and will be used and relied upon by City to verify SBE eligibility and compliance with SBE certification and documentation requirements.

B. "Base Bid" means a Bid for Public Works to be performed or Supplies or Services to be furnished under a City Contract, including additives, alternates, deductives, excluding force accounts, and taxes collected separately pursuant to Washington Administrative Code ("WAC") 458-20-171.

C. "Bid" means an offer submitted by a Respondent to furnish Supplies, Services, and/or Public Works in conformity with the Specifications and any other written terms and conditions included in a City request for such offer.

D. "Bidder" means an entity or individual who submits a Bid, Proposal or Quote. See also "Respondent."

E. "City" means all Departments, Divisions and agencies of the City of Tacoma.

F. "Contract" means any type of legally binding agreement regardless of form or title that governs the terms and conditions for procurement of Public Works and Improvements and/or Non-Public Works and Improvements Supplies and Services. Contracts include the terms and conditions found in Specifications, Bidder or Respondent Submittals, and purchase orders issued by the City. A "Contract" as used in this chapter shall include an agreement between the City and a non-profit entity to perform construction-related services for Public Works. A "Contract" does not include: (1) awards made by the City with federal/state grant or City general funds monies to a non-profit entity where the City offers assistance, guidance, or supervision on a project or program, and the recipient of the grant awards uses the grant moneys to provide services to the

community; (2) sales transactions where the City sells its personal or real property; (3) a loan transaction where the City is acting as a debtor or a creditor; (4) lease, franchise; (5) agreements to use City real property (such as Licenses, Permits and Easements) and, (6) banking and other financial or investment services.

G. "Contractor" means any Person that presents a Submittal to the City, enters into a Contract with the City, and/or performs all or any part of a Contract awarded by the City, for the provision of Public Works, or Non-Public Works and Improvements, Supplies or Services.

H. "Evaluated Bid" means a Bid that factors each Respondent's Base Bid including any alternates, deductive and additives selected by the City that will result in a weighed reduction based on that Respondent's percentage of SBE participation, as defined by formula set forth in this chapter or in the SBE Regulations adopted pursuant to this chapter.

I. "Goals" means the annual level of participation by SBEs in City Contracts as established in this chapter, the SBE Regulations, or as necessary to comply with applicable federal and state nondiscrimination laws and regulations. Goals for individual Contracts may be adjusted as provided for in this chapter and shall not be construed as a minimum for any particular Contract or for any particular geographical area.

J. "SBE Certified Business" (or "SBEs") means a business that meets the criteria set forth in Section 1.07.050 of this chapter and has been certified as meeting that criteria by the Community and Economic Development Department-SBE Program Coordinator.

K. "SBE Program Coordinator" means the individual appointed, from time to time, by the City's Community and Economic Development Director to administer the SBE Regulations.

L. "SBE Regulations" shall mean the written regulations and procedures adopted pursuant to this chapter for procurement of Supplies, Services and Public Works.

M. "Lowest and Best Responsible Bidder" means the Bidder submitting the lowest Bid received that is within the range of acceptable bids, that also has the ability to timely perform the Contract bid upon considering such factors as financial resources, skills, quality of materials, past work record, and ability to comply with state, federal, and local requirements, including those set forth in the SBE Regulations.

N. "Non-Public Works and Improvements" means all competitively solicited procurement of Supplies and/or Services by the City not solicited as Public Works.

O. "Person" means individuals, companies, corporations, partnerships, associations, cooperatives, any other legally recognized business entity, legal representative, trustee, or receivers.

P. "Proposal" means a written offer to furnish Supplies or Services in response to a Request for Proposals. This term may be further defined in the Purchasing Policy Manual and/or in competitive solicitations issued by the City.

Q. "Public Works (or "Public Works and Improvements)" means all work, construction, alteration, repair, or improvement other than ordinary maintenance, executed at the cost of the City, or that is by law a lien or charge on any property therein. This term includes all Supplies, materials, tools, and equipment to be furnished in accordance with the Contract for such work, construction, alteration, repair, or improvement.

R. "Quote" means a competitively solicited written offer to furnish Supplies or Services by a method of procurement that is less formalized than a Bid or a Proposal. This term may be further defined in the Purchasing Policy Manual.

S. "Respondent" means any entity or Person, other than a City employee, that provides a Submittal in response to a request for Bids, Request for Proposals, Request for Qualifications, request for quotes or other request for information, as such terms are defined in Section 1.06.251 TMC. This term includes any such entity or Person whether designated as a supplier, seller, vendor, proposer, Bidder, Contractor, consultant, merchant, or service provider that; (1) assumes a contractual responsibility to the City for provision of Supplies, Services, and/or Public Works; (2) is recognized by its industry as a provider of such Supplies, Services, and/or Public works; (3) has facilities similar to those commonly used by Persons engaged in the same or similar business; and/or (4) distributes, delivers, sells, or services a product or performs a Commercially Useful Function.

T. "Services" means non-Public Works and Improvements services and includes professional services, personal services, and purchased services, as such terms are defined in Section 1.06.251 TMC and/or the City's Purchasing Policy Manual.

U. "Submittal" means Bids, Proposals, Quotes, qualifications or other information submitted in response to requests for Bids, Requests for Proposals, Requests for Qualifications, requests for Quotations, or other City requests for information, as such terms are defined in Section 1.06.251 TMC.

V. "Supplies" means materials, Supplies, and other products that are procured by the City through a competitive process for either Public Works procurement or Non-Public Works and Improvements procurement unless an approved waiver has been granted by the appropriate authority.

(Ord. 28274 Ex. A; passed Dec. 16, 2014: Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.030 Discrimination prohibited.

A. No person that is engaged in the construction of public works for the City, engaged in the furnishing of laborers or craftspeople for public works of the City, or is engaged for compensation in the provision of non-public works and improvements supplies and/or services to the City, shall discriminate against any other person on the basis of race, religion, color, national origin or ancestry, sex, gender identity, sexual orientation, age, marital status, familial status, or the presence of any sensory, mental or physical disability in employment. Such discrimination includes the unfair treatment or denial of normal privileges to a person as manifested in employment upgrades, demotions, transfers, layoffs, termination, rates of pay, recruitment of employees, or advertisement for employment.

B. The violation of the terms of RCW 49.60 or Chapter 1.29 TMC by any person that is engaged in the construction of public works for the City, is engaged in the furnishing of laborers or craftspeople for public works of the City, or is engaged for compensation in the provision of non-public works and improvements supplies and/or services shall result in the rebuttable presumption that the terms of this chapter have also been violated. Such violation may result in termination of any City contract the violator may have with the City and/or the violator's ineligibility for further City Contracts.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.040 Program administration.

A. The Community and Economic Development Director, or his or her designated SBE Program Coordinator, shall be responsible for administering this chapter and obtaining compliance with respect to contracts entered into by the City and/or its contractors. It shall be the duty of the Director to pursue the objectives of this chapter by conference, conciliation, persuasion, investigation, or enforcement action, as may be necessary under the circumstances. The Director is authorized to implement an administrative and compliance program to meet these responsibilities and objectives.

B. The Director is hereby authorized to adopt and to amend administrative rules and regulations known as the SBE Regulations to properly implement and administer the provisions of this chapter. The SBE Regulations shall be in conformance with City of Tacoma policies and state and federal laws and be designed to encourage achievement of the SBE goals set forth herein. The SBE Regulations shall become effective following public notice and an opportunity to comment by the public.

C. The SBE Regulations adopted pursuant to this section are for the administrative and procedural guidance of the officers and employees of the City and are further expressions of the public policy of the City. The SBE Regulations, when adopted, shall not confer an independent cause of action or claim for relief cognizable in the courts of the state of Washington or the United States of America to any third parties, and such provisions shall not be used as the basis for a lawsuit in any court of competent jurisdiction challenging the award of any contract by the City.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.050 Certification.

A. The SBE Program Coordinator shall approve a person as a SBE Certified Business if all of the following criteria are satisfied:

1. Each person with an ownership interest in the company has a personal net worth of less than $1,320,000 excluding one personal residence and the net worth of the business;

2. The company's total gross receipts for any consecutive three year period within the last six years is not more than $36,500,000 for public works companies and not more than $15,000,000 for non-public works and improvements companies;

3. The owner(s) of the company executes an Affidavit of Small Business Enterprise Certification and files it with the City which states that all information submitted on the SBE application is accurate, that the business has sought or intends to do business with the City and/or within the Pierce County area and has experienced or expects to experience difficulty competing for such business due to financial limitations that impair its ability to compete against larger firms; and

4. The company can demonstrate that it also meets at least one of the following additional requirements:

a. The company's business offices, or the personal residence of the owner, is located within a City of Tacoma designated Renewal Community/Community Empowerment Zone, prior to designation as a SBE, or

b. The company's business offices, or the personal residence of the owner, is located within the City of Tacoma for at least six months prior to designation as a SBE; or

c. The company's business offices are located in a federally designated HUBZONE in Pierce County or any adjacent county for at least 12 months prior to designation as a SBE; or

d. The company's business offices are located in a federally designated HUBZONE in a County wherein the work will be performed, or an adjacent county, for at least 12 months prior to designation as a SBE.

B. Application Process. The SBE Program Coordinator shall make the initial determination regarding certification or recertification. Each SBE applicant shall provide the following documents; as such documents are more fully described in the SBE Regulations, to the SBE Program Coordinator:

1. A completed Statement of Personal Net Worth form;

2. A completed, signed, and notarized Affidavit of Small Business Enterprise Certification that affirms compliance with the certification and documentation requirements of this section;

3. List of equipment and vehicles used by the SBE;

4. Description of company structure and owners;

5. Such additional information as the SBE Program Coordinator or designee may require.

When another governmental entity has an equivalent SBE classification process the City may enter into an interlocal cooperative agreement for mutual recognition of certifications.

C. Recertification. A SBE qualified business shall demonstrate annually to the satisfaction of the SBE Program Coordinator that the following SBE qualifications are still in effect for such business:

1. That the company still meets all of the criteria set forth in subsection 1.07.050.A. TMC, and

2. That the company has maintained all applicable and necessary licenses in the intervening period, and

3. That the company demonstrates that the owner and/or designated employees have completed the minimum annual continuing business education training requirements set forth in the SBE Regulations.

D. Appeals. The applicant may appeal any certification determination by the SBE Program Coordinator under this chapter to the Director. The appeal must be made in writing and must set forth the specific reasons for the appeal. The Director shall make a decision on the appeal request within a reasonable time, which decision shall be final unless further appeal is made to the Hearing Examiner. In that event, the Hearing Examiner Rules of Procedure for Hearings, Chapter 1.23 TMC, shall be applicable to that appeal proceeding.

(Ord. 28274 Ex. A; passed Dec. 16, 2014: Ord. 28147 Ex. A; passed May 7, 2013: Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.060 Program requirements.

A. Establishment of Annual SBE Goals. The SBE Regulations adopted pursuant to this chapter shall state reasonably achievable cumulative annual goals for utilization of SBEs in the provision of supplies, services, and public works procured by the City. Cumulative annual goals for the participation of SBEs in City contracts shall be based on the number of qualified SBEs operating within Pierce County or in a county that is adjacent to Pierce County or in a HUBZone in a county where the supplies, services and/or public works will be delivered or performed. The dollar value of all contracts awarded by the City to SBEs in the procurement of supplies, services, and public works shall be counted toward the accomplishment of the applicable SBE goal. The initial cumulative annual SBE goal for all public works, non-public works and improvements supplies and services procured by the City of Tacoma is 22 percent.

B. Revision of Annual SBE Goals. SBE utilization goals for supplies, services, and public works shall be reviewed annually to determine the total level of SBE participation reasonably attainable. If no certified SBEs are available to provide supplies, services, and/or public works, the dollar value of such supplies, services, or public works shall be exempt from the calculation of the cumulative annual goals set forth in the SBE Regulations. Proposed reduction of the cumulative annual SBE goals shall be in accordance with the SBE Regulations.

C. Application of SBE Goals to Contracts. The SBE Program Coordinator shall consult with City departments/divisions to establish the SBE goal for competitively solicited contracts of $25,000 and above, in accordance with this chapter and the SBE Regulations. No SBE goal will be established if no certified SBEs are available to provide supplies, services and/or public works.

D. Waivers. City departments/divisions or the SBE Program Coordinator may request to waive one or more of the requirements of this chapter as they apply to a particular contract or contracts. Waivers may be granted in any one or more of the following circumstances:

1. Emergency: The supplies, services and/or public works must be provided with such immediacy that neither the City nor the contractor can comply with the requirements herein. Such emergency and waiver must be documented by the department/division awarding the contract.

2. Not Practicable: Compliance with the requirements of this chapter would impose an unwarranted economic burden or risk to the City after consideration of existing budgetary approvals.

3. Sole source: The supplies, services, and/or public works are available from only one source, and subcontracting possibilities do not reasonably exist as determined by the finance purchasing manager.

4. Government purchasing. The City is a party to or included in a federal, state or inter-local government purchasing agreement as approved by the finance purchasing manager.

5. Lack of SBEs: An insufficient number of qualified SBE contractors exist to create SBE utilization opportunities.

6. Best interests of the City: Waiver of SBE goals is in the best interests of the City due to unforeseen circumstances, provided that said circumstances are set forth in writing by the requestor.

E. Review of Waivers. A waiver determination by the finance purchasing manager may be reviewed by the Board of Contracts and Awards (C&A Board). The C&A Board may also review a request to reduce or waive the SBE utilization goals based on Not Practicable or Best Interests of the City circumstances. The C&A Board shall determine whether compliance with such goals would impose unwarranted economic burden on, or risk to, the City of Tacoma as compared with the degree to which the purposes and policies of this chapter would be furthered by requiring compliance. If the determination of the C&A Board does not resolve the matter, a final determination shall be made by the City Council or Public Utility Board, as the case may be.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.070 Evaluation of submittals.

A. All submittals for a supplies, services, or public works and improvements contract valued at $25,000 or more shall be evaluated for attainment of the SBE goal established for that contract in accordance with this chapter and the SBE Regulations.

B. The determination of SBE usage and the calculation of SBE goal attainment per this section shall include the following considerations:

1. General. The dollar value of the contract awarded by the City to a SBE in the procurement of supplies, services, or public works shall be counted toward achievement of the SBE goal.

2. Supplies. A public works and improvements contractor may receive credit toward attainment of the SBE goal for expenditures for supplies obtained from a SBE; provided such SBE assumes the actual and contractual responsibility for delivering the supplies with its resources. The contractor may also receive credit toward attainment of the SBE goal for the amount of the commission paid to a SBE resulting from a supplies contract with the City; provided the SBE performs a commercially useful function in the process.

3. Services and Public Works subcontracts. Any bid by a certified SBE or a bidder that utilizes a certified SBE shall receive credit toward SBE goal attainment based on the percentage of SBE usage demonstrated in the bid. A contractor that utilizes a SBE-certified subcontractor to provide services or public works shall receive a credit toward the contractor's attainment of the SBE goal based on the value of the subcontract with that SBE.

4. Brokers, Fronts, or Similar Pass-Through Arrangements. SBEs acting as brokers, fronts, or similar pass-through arrangements (as such terms are defined in the SBE Regulations) shall not count toward SBE goal attainment unless the activity reflects normal industry practices and the broker performs a commercially useful function.

C. Evaluation of competitively solicited submittals for public works and improvements and for services when a SBE utilization goal has been established for the contract to be awarded shall be as follows:

1. When contract award is based on price. The lowest priced bid submitted by a responsive and responsible bidder will be reviewed to determine if it meets the SBE goal. Such low bid shall be determined to meet the SBE goal if the bidder is a certified SBE.

a. If the low bidder meets the SBE goal, the bid shall be presumed the lowest and best responsible bid for contract award.

b. If the lowest priced bid does not meet the SBE goal, but the bid of any other responsive and responsible bidder does, and such other bid(s) is or are priced within five percent of the lowest bid, then the following formula shall be applied to each such other bid:

$$\text{(Base Bid)} \left[\frac{\text{SBE Usage Percentages}}{\text{SBE Goal Percentages}} \text{ X (.05 X Low Base Bid)} \right] = \text{Evaluated Bid}$$

c. The lowest evaluated bid after applying said evaluation formula shall be presumed the lowest and best responsible bid for contract award.

d. In no event shall a bidder's evaluated bid price be adjusted more than 5 percent from its base bid price for purposes of contract award.

2. When contract award is based on qualifications or other performance criteria in addition to price. Solicitations shall utilize a scoring system that promotes participation by certified SBEs. Submittals by respondents determined to be qualified may be further evaluated based on price using the formula applicable to price based contract awards above. The SBE Regulations may establish further requirements and procedures for final selection and contract award, including:

a. Evaluation of solicitations for Architectural and Engineering (A&E) services;

b. Evaluation and selection of submittals in response to requests for proposals; and

c. Selection of contractors from pre-qualified roster(s).

D. Evaluation of competitively solicited submittals for supplies when no SBE utilization goal has been established for the contract to be awarded shall encourage SBE participation as follows:

1. A submittal from a responsive certified SBE that is priced within five percent of the otherwise lowest responsive bid shall be recommended for award. Otherwise, the lowest responsive bidder shall be recommended for contract award.

E. The SBE Regulations may establish further SBE goal evaluation requirements and procedures for award of contracts between $5,000 and $25,000.00 and for non-competitively solicited contracts. City departments/divisions shall use due diligence to encourage and obtain SBE participation for supplies, services, and public works contracts under $5,000.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.080 Contract compliance.

A. The contractor awarded a contract based on SBE participation shall, during the term of the contract, comply with the SBE goal established in said contract. To ensure compliance with this requirement following contract award, the following provisions apply:

1. Any substitutions for or failure to utilize SBEs projected to be used must be approved in advance by the SBE Program Coordinator. Substitution of one SBE with another shall be allowed where there has been a refusal to execute necessary agreements by the original SBE, a default on agreements previously made or other reasonable excuse; provided that the substitution does not increase the dollar amount of the bid.

2. Where it is shown that no other SBE is available as a substitute and that failure to secure participation by the SBE identified in the solicitation is not the fault of the respondent, substitution with a non-SBE shall be allowed; provided, that, the substitution does not increase the dollar amount of the bid.

3. If the SBE Program Coordinator determines that the contractor has not reasonably and actively pursued the use of replacement SBE(s), such contractor shall be deemed to be in non-compliance.

B. Record Keeping. All contracts shall require contractors to maintain relevant records and information necessary to document compliance with this chapter and the contractor's utilization of SBEs, and shall include the right of the City to inspect such records.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.090 Program monitoring.

A. The SBE Program Coordinator shall monitor compliance with all provisions of this chapter and the SBE Regulations. The SBE Program Coordinator shall establish procedures to collect data and monitor the effect of the provisions of this chapter to assure, insofar as is practical, that the remedies set forth herein do not disproportionately favor one or more racial, gender, ethnic, or other protected groups, and that the remedies do not remain in effect beyond the point that they are required to

eliminate the effects of under utilization in City contracting. The SBE Program Coordinator shall have the authority to obtain from City departments/divisions, respondents, and contractors such relevant records, documents, and other information as is reasonably necessary to determine compliance.

B. The SBE Program Coordinator shall submit an annual report to the Community and Economic Development Director, Director of Utilities, and the City Manager detailing performance of the program. The report shall document SBE utilization levels, waivers, proposed modifications to the program, and such other matters as may be specified in the SBE Regulations.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.100 Enforcement.

The Director, or his or her designee, may investigate the employment practices of contractors to determine whether or not the requirements of this chapter have been violated. Such investigation shall be conducted in accordance with the procedures established in the SBE Regulations.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.110 Remedies.

A. Upon receipt of a determination of contractor violation by the SBE Program Coordinator, the City Manager or Director of Utilities, as appropriate, may take the following actions, singly or together, as appropriate:

1. Forfeit the contractor's bid bond and/or performance bond;

2. Publish notice of the contractor's noncompliance;

3. Cancel, terminate, or suspend the contractor's contract, or portion thereof;

4. Withhold funds due contractor until compliance is achieved; and/or

5. Recommend appropriate action including, but not limited to, disqualification of eligibility for future contract awards by the City (debarment) per Section 1.06.279 TMC;

B. Prior to exercise of any of the foregoing remedies, the City shall provide written notice to the contractor specifying the violation and the City's intent to exercise such remedy or remedies. The notice shall provide that each specified remedy becomes effective within ten business days of receipt unless the contractor appeals said action to the Hearing Examiner pursuant to Chapter 1.23 TMC.

C. When non-compliance with this chapter or the SBE Regulations has occurred, the SBE Program Coordinator and the department/division responsible for enforcement of the contract may allow continuation of the contract upon the contractor's development of a plan for compliance acceptable to the Director.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.120 Unlawful acts.

It shall be unlawful for any Person to willfully prevent or attempt to prevent, by intimidation, threats, coercion, or otherwise, any Person from complying with the provisions of this chapter.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.130 Severability.

If any section of this chapter or its application to any Person or circumstance is held invalid by a court of competent jurisdiction, then the remaining sections of this chapter, or the application of the provisions to other Persons or circumstances, shall not be affected.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.140 Sunset and review of program.

This chapter shall be in effect through and until December 31, 2019, unless the City Council shall determine at an earlier date that the requirements of this chapter are no longer necessary. If this chapter has not been repealed by July 1, 2019, the City Council shall determine by the end of that year whether substantial effects or lack of opportunity of SBEs remain true in the relevant market and whether, and for how long, some or all of the requirements of this chapter should remain in effect.

(Ord. 28274 Ex. A; passed Dec. 16, 2014: Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

APPENDIX D

Business Process Blueprint Template

Business Process Blueprint Work Process Template

SAP Development Methodology

SAP Development Naming Standards

SAP NetWeaver PI Development Standards

SAP NetWeaver PI Development Naming Standards

Functional Requirements Template

Functional/Technical Document Template

Interface Technical Specification – PI Template

Technical Specification Template

Test Script Template

Sample Table of Contents for Training Module

Task Template

Standard Operating Procedure Template

Versions

Business Process Blueprint Amendments					
All changes to this business process blueprint shall be summarized in the following table.					
Version	**Changed by**	**Description of Change**	**Section**	**Approved by** *(Name of Business unit and Name of KDC/Designee)*	**Approval Date**
0		Original Document			
Example: 1	Epugmire	Added a new process	2.2	Budgeting, John Smith	10/10/10

1.0 – Overview

1.1– Brief Description

<Brief Process Description - No greater than three sentences >

1.2 - Contacts

Contact	Details
Business Process Owner	<Business Unit(s)>
Key Department Contact (KDC)	<Name, Division>
EASD Functional Contact	<Functional Team Member><EASD work group>

2.0 – Process Details

2.1 – Process Description
<State end-to-end process description in detail>

2.2 Process Flow Diagram
<Copy of the process diagram or link to the process diagram>

2.3 – Input Process Requirements

Inputs/Prerequisites	
Event	**Input/Prerequisite Description**

2.4 – Events

Events <Event number is linked to Diagram>	
Event #	**Event Description**
1.	
2.	
3.	
4.	
5.	

2.5 – Outputs

Outputs	
Event #	**Output Description**

2.6 – Transaction Summary

Transaction Summary	
Transaction	**Transaction Description**

3.0 – Business Requirements

3.1 – Business Rules

Business Rules	
Event #	**Business Rule Description**

3.2 – Control Points

Control Points	
Event #	**Control Point Description**

3.3 – Legal Requirements

Legal Requirements	
Event #	**Legal Requirement Description**

4.0 – Related Requirements

Some of the related document types are:

- Form Technical Requirement (FTR),
- Interface Technical Requirement (ITR),
- Report Technical Requirement (RTR),
- Enhancement Technical Requirement (ETR),
- Workflow Technical Requirement (WTR)

4.1 – Related document

Event #	**Doc Type**	**Development ID & Name**	**Transaction**

5.0 – Other Information

Other Information
<Any additional information such as gap or work around>

Business Process Blueprint Work Instructions

Effective date:
March 5th, 2010

Business Blueprint Work Instructions **Amendments**				
All changes to this business process blueprint shall be summarized in the following table.				
Version	**Change by**	**Description of Change**	**Section**	**Date**
2	BPB Process team	Updated the document	Header, Version, and 1.0	02/15/2010
1	BPB Process team	Updated the document	Most of the sections	12/07/2009
0		Original Document		

Purpose/Preface:

The Business Process Blueprint is a detailed description of our business processes. The business process blueprint defines the business scenarios, business processes and process steps which are organized in a hierarchical structure. The content of the Business Process is owned and approved by the business units KDC or designee. The IT Business Functional teams are stewards of the BPB document.

This document is intended to:

- Provide the work instructions for Business Process Blueprint (BPB) documentation.
- Provide additional information about why the BPB document is needed and how it is delivered.
- Provide the foundation for building quality standards.

This document template is owned by IT/EASD department and any modification on this document must be reviewed by the owner of the document. Any changes to the BPB template that affect form, fit, or function must be submitted through the Functional point of contact.

Please note:

1. All fields are required unless otherwise noted. Blanks are not acceptable; however where indicated, "N/A" is acceptable.
2. Insert more rows in each section as necessary while still maintaining the integrity of the form.

Questions or suggestions regarding the BPB template should be directed to the BPB Functional point of contact.

Note: Event numbers used throughout the Business Process Blueprint relate to individual steps in the diagram.

Section	Description
Header	Enter the BPB ID and the Title of the BPB Document. Business Process Number in the following format <P-AANNN> and P(=Process) – AA(=sub module) NNN(Business Process Number). The Business Process Name provided by IT/EASD. Also, before creating a new BPB document, use BPML for finding the next available BPB id and also update the BPML accordingly. BPML could be found at IT-SAP-Change Management team SharePoint
Versions	All amendments to document are recorded here. Sequential number of Version, Name of person modifying document, Description of Change, Section changed, Approved by name of the business unit and approver, and Date of approval.
BPB Template Version	This is BPB template version and this should be modified only after approval from the functional point of contact for BPB document.

Section	Description
1.0 – Overview	Header only, no text required
1.1 – Brief Description	Brief overview of the business process to be documented, not more than three sentences.
1.2 – Contacts	Header only, no text required.
Business Process Owner	State the Business unit, who owns the Business process.
Key Department Contact (KDC)	State the name and division of the Key Departmental Contact(s) (KDC)
Functional Team Contact	State the name of current functional team member and EASD work group.

Section	Description
2.0 – Process Details	Header only, no text required
2.1 –Process Description	Detailed description of the end-to-end business process. The process details should include pre requisite(s) and output process (es).
2.2 – Process Flow Diagram	Place a copy of the process flow diagram/graphic/matrix in this section. The Visio could be used to depict the process flow diagram. If the process flow diagram is too large, place a link to the diagram here. Please make sure that Link is not broken at any given point of time.
2.3 – Process Requirements	Inputs/prerequisites that must exist in order for the process to be implemented. May be the result of output from a different process, or may be data gathered outside the system. Event numbers should correspond with the process flow diagram.
2.4 – Events	Each step within the process flow diagram must be assigned an event

	number. All events in the process should be listed here in numerical order with their description.
2.5 – Outputs	Technical (i.e. forms, letters, workflows, reports) and/or Non-technical (i.e. Confirmation number for payment, confirmation number for payment arrangements, document created) outputs produced by process events. Event numbers should correspond with the process flow diagram.

2.6- Transaction Summary	Transactions executed in the process flow events and their description. N/A is acceptable.

Section	Description
3.0 – Business Requirements	Header only, no text required
3.1 – Business Rules	Procedural rules defined by the business unit that govern a specific process. Event numbers should correspond with the process flow diagram. N/A is acceptable.
3.2 – Control Points	Controls Points are check or approval events within the process. Event numbers should correspond with the process flow diagram. N/A is acceptable.
3.3 – Legal Requirements	Documentation or reference numbers for any legal requirements (city ordinances, state laws, etc.) the process must meet. Event numbers should correspond with the process flow diagram. N/A is acceptable.

Section	Description
4.0 – Related Requirements	Header only, no text required Outputs produced from process events. Some of the related document types are: • Form Technical Requirement (FTR) • Interface Technical Requirement (ITR) • Report Technical Requirement (RTR) • Enhancement Technical Requirement (ETR) • Workflow Technical Requirement (WTR)
4.1 – Related Documents	This section contains the Type of document, event number which corresponds to the process flow diagram, development ID (xTR-AANNN) and name, and transaction (if applicable). N/A is acceptable.

Section	Description
5.0 – Other Information	This section contains any additional information. N/A is acceptable.

City of Tacoma

SAP Development Methodology

5 July, 2018

Version 3.2

Document Release Information

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2.0	22 May 2008	Development Standards Team	Major Revision
3.0	June 30th	Stephanie Peterson	**5.2** Statistics: **5.6** Coding – General Added about messages **5.8** Forms **5.9** ZFILE Logical Filenames and ZCIA Interface Architecture **5.10** UNIX Client Applications **10.1** Security and Authorization Models **Appendix N:** Use of Oracle SQL Developer – Query Tool
3.1	01 Nov 2013	Bryan Pierce	Updated 10.1 Security and Auth Models for &NC& settings.
3.2	7 May 2015	Ramesh Mohan	Update to table updates .
3.3	27 Oct 2015	Ramesh Mohan	Updates to creating interfaces
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1 Objective

This document describes guidelines to follow and other aids to increase efficiency, speeds, quality and maintainability.

1.1 ABAP as a Platform

ABAP is considered a platform, rather than a language, because of its total integration with the SAP runtime environment. This integration is evident by the lack of a need to "deploy" compiled code.

2 Change Requests

All changes in the SAP system follow the SAP Change and Transport System (CTS) process. It is a better to organize your transports into a single change request for final transport to PRD.

Please refer section 2.1.4 in the Development Naming Standards document located in the Technical Team SharePoint site for the change request "Short Description" rule.

3 Code Enhancements

Before enhancing the code, the developer needs to research whether there is existing SAP functionality. If this is not the case, we should look for standard SAP enhancement locations in the following order: The check list should be evaluated top-down (priority):

- Check for user exits (SE84, CMOD, SMOD)
- Check for BADI s(Business Add-ins) (SE18, SE19, SE24 with CL_EXITHANDLER)
- Check for EVENTS (Workflow events / change pointers events)

Events can be created on db table fields.
Only with BASIS approval shall ABAP code in SAP namespace be modified.
Where no solution can be custom developed an OSS message (request to SAP for help) can be raised – consult your team lead for OSS logging procedures.

4 Re-Use of Objects/Coding

4.1 Function Modules

Function modules allow you to encapsulate and reuse global functions in the R/3 System. They are stored in a central library. The R/3 System contains a wide range of predefined function modules that you can call from any ABAP program. Also we have a wide range of z function modules that are re-useable. When using a function module, use the PATTERN functionality to bring the function call into your application.
Function modules also play an important role in database updates and in remote communications between R/3 Systems or between an R/3 System and a non-SAP system.

For a list of useful function modules, see **Appendix D**.

4.2 Global Class/Object-Methods Repository

You can search global class/object-methods from transaction SE24 or SE84. You may use the PATTERN functionality to get the class-method or create the object-method.

4.3 Include Library

One or more includes libraries have been created, which contain reusable code.
Use transaction SE84 to search for reusable code. Custom Includes should be created to begin with the naming standard of "ZN_".
Examples of routines which may be used are:

- Batch Input routines (call transaction) like BDC_DYNPRO, BDC_FIELD
- Macros. Examples are:
  - INC <variable> Increments <variable with 1>
  - DEC <variable> Decrements <variable with 1>
- Constants which should be used by all programmers. Examples:
  - cc_true "X"
  - cc_false ""

If new functionality must be added to existing macros/routines etc, you have to make sure it does not interfere with the existing functionality. If not possible, a new object should be created with the new functionality.

The file ZN_UT001 (Split a comma delimited file) is going to be the first include file and contains the above-mentioned items plus a few more. The list of available macros is included in **Appendix K**.
Also see the following examples of custom Includes:

ZN_UT002 (Application Log Processes)
ZN_UT003 (Print Workbench Include File for Usage with Adobe Central Pro)
ZN_VARIANT (Variant Selection)

4.4 Reuse Library

SAP provides help for re-using existing blocks of code. This section has been moved to **Appendix F**: Reuse Library (BC-DWB-UTL). The transaction in SAP where you can find all the information is SE83.

4.5 Patterns

This is an option available in the ABAP editor. With this functionality, standard blocks of code can be created, assigned a name and then imported into any ABAP source code. This way, common code blocks can be used by anybody who wants to use that block of code (pattern).

The COT* patterns should be used to maintain consistency for program headers and commenting.

Examples of COT* patterns are:

COT-CHANGE_IN_CODE
COT-FUNCTION_HEADER
COT-INCLUDE_HEADER
COT-INTERFACE_IN
COT-INTERFACE_OUT
COT-REPORT_HEADER

5 Coding

5.1 Variables

- When creating test programs which are not intended for production, ALWAYS start your developments in the Y custom namespace (e.g. Y_HMTEST). The Z namespace is intended for development that will eventually be transported to production only.
- Variables MUST use the TYPE statement if they are being used in relation to database fields.
- Variable declaration MUST have a description next to it (use the “)
- Variables names must meet the naming conventions. See the document “Development Naming Standards”.
- Constants must be declared if constant values are being used.
- Avoid the use of global variables when creating routines which possibly can be used by other applications. Such a routine might be lifted out of the context and moved to an include file for general use. When global variables are used inside the routine, this lift-out will be harder to achieve. Instead, try to use parameters for such routines.
- Check the SYST structure (see also Appendix A) and use as many system variables as possible. Do not use other tricks to get the information which is ready to use from SYST.
- **CONCATENATE:** the disadvantage of this statement is that it concatenates only string variables, numerical variables must be converted first. Also, you have to declare a new variable to store the result into. Solution: use the macro CONCAT and CONCAT_SP (no conversion needed and the into-variable is already there…ready to use). See the include **ZN_UT001**.

5.2 Database Access

SAP utilizes its own proprietary SQL language, Open SQL, and it is the recommended query language for all database communication. Native SQL is supported but is to only be used when absolutely necessary. Any use of Native SQL requires review and approval from the database administrator.

The priority use of techniques in retrieving data from the database is as follows:

Single row selects:
BAPI, use objects from the BOR and use the methods to get the data.
If no BAPI available, use function modules (e.g. ….SELECT_SINGLE)
If also not available, then you can use open SQL.

See also: **Appendix M**: ABAP Performance Guidelines.

Multiple row select:
As there are many techniques to accomplishing multiple row selects it is recommended to follow the concepts outlined in **Appendix M**: ABAP Performance Guidelines.

Updates:
Locking of any data to update MUST happen via ENQUEUE and DEQUEUE techniques. This should occur for any INSERT, UPDATE, MODIFY, or DELETE statement. The preferred sequence to follow enqueue/dequeue best practice functionality is as follows:

- Utilize BAPIs for any DML (data manipulation language) action is advisable as this locking is already performed by SAP. The enqueue and dequeue functionality is embedded into the BAPI logic. **Note**: Most BAPIs do not provide COMMIT WORK actions and as such you will need to provide one. The FMs BAPI_TRANSACTION_COMMIT and BAPI_TRANSACTION_ROLLBACK can be utilized for this purpose.
- Create your own lock objects via SE11 for all tables or views. Ensure correct practice of LUW (logical unit of work) concepts for all DML actions.

Per BASIS request, the use of the MODIFY statement is not recommended as it can create performance optimization issues. Its use is limited to situations where minimal record manipulation is to occur and should by no means ever be used for processing of mass data updates.

Indexes:
When using Open SQL, every attempt should be made to make sure that the *where* clause is not in violation with the indexes on the database table. Try to select in such a ways that it uses existing indexes. If this is not possible, contact BASIS and discuss your index requirements.

Statistics:
When your program changes a table by 20%, you must update the statistics manually after your table build. This also updates indexes as well. Basis has a batch job that does this every morning but is busy keeping the small changes updated. Oracle relies on the indexes and statistics to perform in the best possible way. If the statistics are too poor then Oracle will do a table scan which is the worst way for SAP to retrieve data. Coordinate through Basis Database Administrator.

Example:

```
EXEC SQL.
      ANALYZE TABLE ZTBL_OBJECT_RULE COMPUTE STATISTICS
ENDEXEC.
```

5.3 Modifications

A full modification history is required for every ABAP program/function module or other areas which contain ABAP source code. The modification history, please use the Header Pattern, (at the top of the code) should contain:

- Programmer name
- Date of modification (creation)
- Modification (creation) description
- Change request number
- iSTAR Project number (on initial creation, this can be left blank)

When creating a new ABAP source code, the template for this (the top of the ABAP code) will be inserted when using the *pattern* (see also the chapter PATTERNS).
Changes made once the program has been in production, should contain a comment for EACH code change made. The comment should contain:

- Programmer name
- Date of modification
- iSTAR Project number (should be in sync with the iSTAR Project number in the modification history at the top of the code)

The template for this comment line can be retrieved from the *pattern* COT-CHANGE_IN_CODE. This *pattern* should only be used for changes made for an application which has been in production already and for which a request has been raised and a project number is available.

5.4 Lists

SAP has standard list creation and manipulation functions.
Strongly encourage to use REUSE_ALV_LIST_DISPLAY.
See example in Demo report:
BALVSD11: Demo program ALV: Simple list with interactions and layouts.

The functions for ALV display are being replaced with ABAP classes. When you are developing new reports use CL_GUI_ALV_GRID, CL_GUI_ALV_TREE or other ABAP classes for GUI display wherever possible.

5.5 Comments

Comments are required in the ABAP source code anywhere where the code is not straightforward on its own. It should act as a guide for a person not familiar with the application, and enable a programmer to understand the intent of the original developer.

Items with mandatory comments:

- All subroutines should be commented as to their purpose and method.
- Branches in the program such as IF or CASE statements
- SELECT Statements which are not immediately obvious.
- Function Calls
- Everywhere else where the functionality and the intentions are not obvious
- For more information on comments, see also chapter MODIFICATIONS and VARIABLES.

5.6 Coding – General

- ALWAYS use Pretty Printer before leaving the source code.
- For proper reading of the code, the editor should be set to "Keyword Uppercase".
- Every routine (FORM statement) should have a standard description of its functionality. To have a routine header created, simply apply Pretty Printer (this only works if there is not already a comment line before the FORM statement).
- Routines (FORMs) should not be bigger than one screen. If necessary create additional subroutines.
- Performance coding: always check SE30 (Tips & Tricks) if in doubt (from the ABAP Development Workbench screen, menu *Environment* → *Performance Examples*)
- For ABAP code examples of all different sorts (HTML control, tree controls, drag-and-drop, context menus, user interface examples and many more), check the transaction DWDM (from the ABAP Development Workbench screen, menu *Environment* → *Controls Examples*)
- If you have any problems with creating a proper GUI interface, check the SAP Style Guide. From the SAP main screen (transaction S000), choose *SAP Library* from the HELP menu. After a short while, a browser window pops up. Choose: *SAP Library* → *Basis Components* → *ABAP Workbench* → *BC – SAP Style Guide.*
- If a transactional program processes for a long time, provide information to the user on what is happening. Show this in the status bar and use the function module SAPGUI_PROGRESS_INDICATOR for this.
- For better understanding of what database access is done by SAP when you are testing your program, check the SQL trace option (ST05). Please check with one of the BASIS team (or your team lead) for a quick demonstration. This is also the place to

check for SQL performance. Colored lines (red) tell you in what SQL statements inefficient table indexing is used. Yellow lines are suspicious.

- When creating selection screens, make sure that every field which refers to an existing database object (e.g. Business Partner), is actually a list box (combo box). The user can then choose from the list instead of just entering the value. Make sure you use the Match Code Object functionality (now called: Search Help) to do that. To get help on that topic, put your cursor on the PARAMETER reserved word in the ABAP editor and press F1.
- Whenever information needs to be retrieved about individual departments, employees or any other HR related data, this will be done via a layer (implemented as function modules). For example, the get the name address, phone, fax etc for a specific department (e.g. City of Tacoma), the function module ZUT_GET_DEPT should be called.
- Before using 'For all entries' to select values, the internal table used in for all entries should be checked for any entries. For all entries using an empty internal table, will try to fetch all the records from the database and this should be avioded.
- Always make sure to populate messages rather than using standard SAP messages.

```
IF sy-subrc <> 0.
   MESSAGE ID sy-msgid TYPE sy-msgty NUMBER sy-msgno
           WITH sy-msgv1 sy-msgv2 sy-msgv3 sy-msgv4.
ENDIF.
```

```
Runtime Error          MESSAGE_TYPE_UNKNOWN
      Occurred on      07/08/2009 at   12:49:58

Message type " " is unknown.

What happened?
```

5.7 Application Locking

In case only one runtime version of an application is allowed (processes cannot be started twice), this needs to be enforced in the code. It can be done by using the following call to a function module.

```
CALL FUNCTION 'ENQUEUE_E_TRDIR'
        EXPORTING
                NAME                = SY-CPROG
        EXCEPTIONS
                FOREIGN LOCK        = 1
                SYSTEM_FAILURE = 2
```

```
                OTHERS                = 3.

IF sy-subrc <> 0
        MESSAGE I000(zsw) WITH sy-msgv1 'Program is already running'.
        LEAVE PROGRAM
ENDIF.
```

It is important and mandatory to free locked objects once updates are completed.

```
 CALL FUNCTION 'DEQUEUE_E_TRDIR'
    EXPORTING
       MODE_TRDIR = 'X'
       NAME       = SY-CPROG
*        X_NAME     = ' '
*        _SCOPE     = '3'
*        _SYNCHRON  = ' '
*        _COLLECT   = ' '
     EXCEPTIONS
       OTHERS     = 1.
```

Please refer to:
http://help.sap.com/saphelp_nw70/helpdata/en/41/7af4c5a79e11d1950f0000e82de14a/content.htm The key word to search it is "**The SAP Lock Concept**".

5.8 Forms

Any new forms must be added to the XREF spreadsheet. The spreadsheet identifies the form with its calling print program. In addition, it lists important characteristics of the form, such as barcodes, signature requirements, and print options.

Smartforms must have the form number on the footer. Optionally, a hidden text that keeps a living comment/history section can help future developers know the life of the form.

See the Development Naming Standards for node naming. This helps the next developer to quickly find the places where he or she needs to debug or fix the form.

SAPscript forms are client dependent. For unit testing the developer needs to transport them to DV1 210 or 220 by using transaction SCC1.

When an application form calls a SAPscript or Smartform, the developer needs to create a link to the development client 200 rather than copy the form to 210. The correct transport path

into QAS and PRD for these forms is the /FORMS/ directory. Important: As application forms only exist in CCS, this is the only place where we use this directory.

Forms that are added to the ZCFA have to be added to the CFA tables.

COT/TPU branding standards apply to all outside correspondence and internet forms. When in doubt, we have to contact CMS for clarification.

5.9 ZFILE Logical Filenames and ZCIA Interface Architecture

Logical Filenames using transaction ZFILE are the preferred method to pointing to paths versus hard coding the path. With ZFILE the path can be changed without having to go to each program to maintain the paths in code. See section 3.9.13 Logical File Paths and section 3.9.14 Logical File names for the naming standards in the Development Naming Standards Document.

The ZCIA Interface Architecture is the preferred method to use when interfacing with other systems and sending files between them. Basically it is the folder structure in SAP.
Basis has a document that needs to be filled out in order for them to build the folder structure.

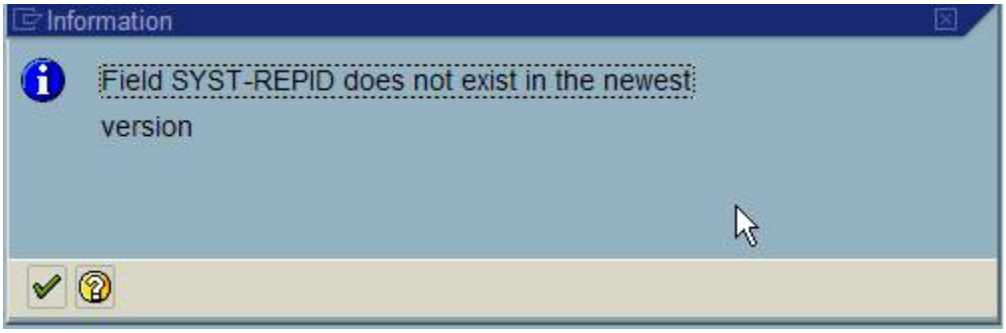
- CALL FUNCTION 'FILE_GET_NAME'

5.10 UNIX Client Applications

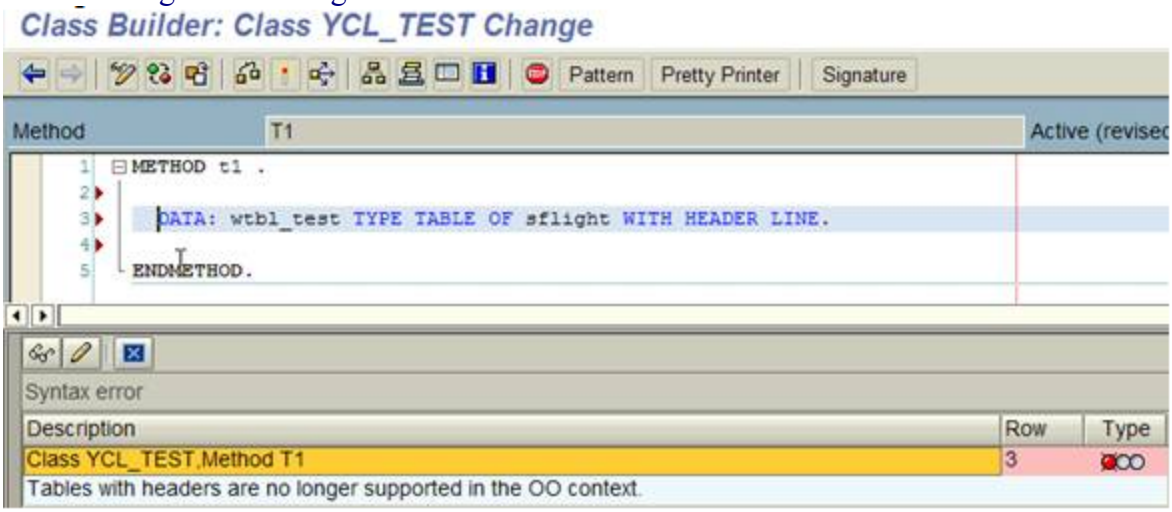
The BASIS team has standard client applications that they prefer developers utilize.
PuTTY – character terminal access using the SSH protocol
SAMBA – file transfer to a home folder or an interface folder using standard windows file sharing (the preferred method - no client required)
WinSCP – file transfer using the SSH protocol (alternate method)
UltraVNC viewer – graphical CDE and (in some cases) GNOME desktop access using the VNC protocol.

5.11 Obsolete Statements

This depends on the system version. The SAP system may warn you when you use an obsolete or soon to be obsolete statement. For example, SY-REPID which is used to represent the program name, is obsolete, and has been replaced by SY-CPROG. The system will show a message like:



Another example; if you declare an internal table with header line in Class Builder, you'll get the following error message:



For detailed information, please refer to our ABAP Reference books.

6 Error Handling

There are quite a few ways to handle errors: which one is appropriate depends on the situation.

Here are some common ways:

- Check SY-SUBRC + messages (the message types, see **Appendix E**).
- For BAPI, do not use SY-SUBRC, see **Appendix E**.
- Use predefined treatable exceptions to catch the errors (+ messages).
- Post the errors with messages to application log.

For more details on error handling for different type of environments and message types, see Appendix E. Error Handling.

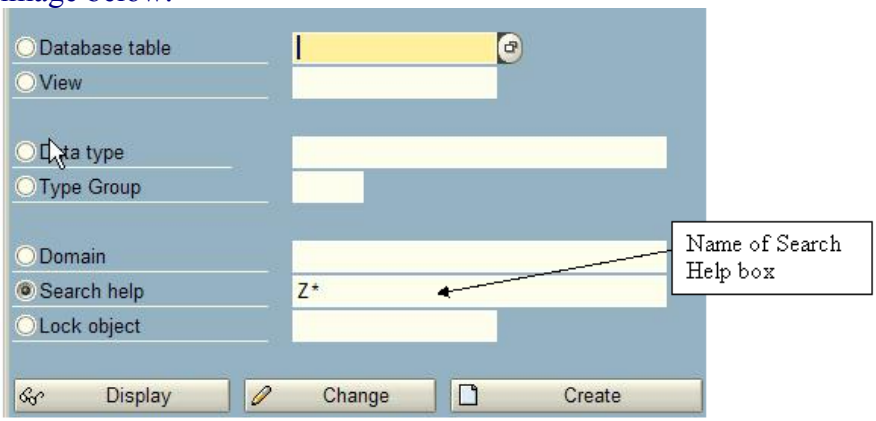
7 Use of Standard SAP Functionality

Always use standard SAP functionality to reduce the effort, errors, and maintenance. Such as: BAPI, released method, released function module, or service function module where ever one exists. Utilize transaction se84. Also, please refer to "4. Re-use of objects/coding".

Always use standard SAP IDOC functionality and standard SAP functions where possible. Be cautious in using unreleased SAP functionality since it may be changed, removed or not supported in future releases/ upgrades/patches (check the attitributes). Also be aware that you should use standard functionality for the module you are developing in, i.e. look at the package.

8 Search Helps

It is recommended to use search helps rather than coding process-on-value requests. For search help detail info, use transaction SE11, select the "Search help" radio button and click "F1". Also, you can search existed search helps from this Name of Search Help box, see image below:



You may also find using the field and examining the domain for the search help information.

9 Hard coding values

It is recommended and good practice to use constants, text symbols, variables, or other objects, such as configurations, to avoid 'Hard Coding' values in programs.

10 Authorization Objects

When coding, we have to take authorization into account. This means we have to call the authorization function modules where applicable. Discuss this with the team lead if in doubt.

Use Standard configurable authorization on transactions, objects wherever possible.

Authorization objects can be also used for complex authorization checks. An authorization object combines up to 10 authorization fields, which are checked using the AND connective. For the authorization check to be successful, user must pass the check for each field contained in the object.

For example, two authorization fields TCD (transaction code) and USER (user name) have been defined in the authorization object AUTHOBJ1; we can check the authorization against the objects as below:

```
AUTHORITY-CHECK OBJECT 'AUTHOBJ1'
  ID 'TCD'  FIELD VAR1
  ID 'USER'  FIELD VAR2.
IF sy-subrc <> 0.
   MESSAGE S001.   " No authorization
ENDIF.
```

For the current username and transaction code, use the system variables:
SY-UNAME and SY-TCODE.

Use SAP standard authorization objects if possible, or otherwise, new custom authorization object can be created. Use SU20 or SU21 to create a custom Authorization Object. Also check with BASIS when doing this.

If any authorization objects are to be used in the program, this should have been specified already in the functional specifications (and so also the technical specifications). Please check with the functional person about this, if it is unclear.

10.1 Security and Authorization Models

SAP custom tables use default authorization group as &NC& that potentially allow users belonging to &NC& authorization group to have access. Standard is to set this value to other than &NC&.

For transactions, set authorization object S_TCODE. Standard value is typically the same value as the transaction name itself.

For tables, set authorization object S_TABU_DIS to be other than &NC&.

11 Follow through

If there are any changes in this document, all technical people will be informed. Any changes to *includes, macros, function modules* etc, needs to be coordinated with the coding standards coordinator. These changes will be logged and will be forwarded to all technical people.

Periodic code reviews will be performed by the coordinator and feedback will be given for situations where corrections are required. Currently Peili Zhang-Way is the Team coordinator.
The requested changes will be reviewed at the Technical Team Meeting for team approval.

Appendix A: Useful Tables and Structures

The following are tables that are useful in custom developed programs for reference and/or validation purposes.

Table Name	Table Type	Use
DD03L	Trans. Table	All tables in the data dictionary and their fields
NRIV	Trans. Table	Number Ranges
BDCDATA	Structure	Structure of table for batch input processing
BDCMSGCOLL	Structure	structure of table to hold all system messages during a CALL TRANSACTION command
T000	Trans. Table	Client Codes
T100	Trans. Table	System Messages
TADIR	Trans. Table	Directory of transportable developments
TDCT	Trans. Table	Directory of dialog modules
TDEVC	Trans. Table	Development classes
TFDIR	Trans. Table	Directory of function modules
TLIBG	Trans. Table	Function groups
TFLIBT	Trans. Table	Function groups short text
TRCL	Trans. Table	ABAP report classes
TRCLT	Trans. Table	ABAP report classes texts
TRDIR	Trans. Table	Directory of reports
TRESE	Trans. Table	Reserved words
TSTC	Trans. Table	Transaction codes
TSTCT	Trans. Table	Transaction code texts
TVARV	Trans. Table	Select variables for ABAP variants
TVDIR	Trans. Table	Directory of table views
DD08L	Trans. Table	List of Check (Value) tables
TFTIT	Trans. Table	Contains all function module names + descr.
TSTCT	Trans. Table	All SAP transaction codes + descr.
SYST	Structure	Int. tbl filled by SAP during runtime. Developers can reference the runtime env. for their progr through the fields of this struc using the "SY-" prefix before the struc field name. There are several useful fields. Most commonly used is "subrc" in "sy-subrc" (give the return value of processes) See the SAP ABAP Command Reference book in the Library.

SCREEN	Structure	Int. tbl filled by SAP during runtime. Attribs of the current screen-fields may then be accessed. Screen-field contents, however, can only be accessed and changed within a "LOOP AT SCREEN....ENDLOOP" statement.

Appendix B: ABAP Data type details

Type	Description	Min. Length	Max. Length	Output Length	Default Output Justification	Initial Value
C	Character (text)	1	65535	field length	left	<Blank>
D	Date	8	8	8	left	"00000000"
F	Floating point number	8		22	right	"0.0"
I	Integer	4		11	right	"0"
N	Numeric text	1	65535	field length	left	"000...0"
P	Packed number	8	16	2 * field length	right	"0"
T	Time	6	6	6	left	"000000"
X	Hexadecimal	1	65535	2 * field length	left	X"00"
STRING	Character String	0	Infinite	Variable	Left	<Blank>
XSTRING	Byte String	0	Infinite	Variable	Left	<Blank>

When using ABAP's "DESCRIBE" keyword, additional data types are returned. These are as follows:

Type	Description
b	1 byte integer without sign
h	Internal table
s	2 byte integer with sign
u	structure without an internal table
v	structure with at least one internal table

Appendix C: Useful Reports

Report Program Name	Description
RSABAPSC	Statistical Program analysis to find all ABAP commands In a program
RSANAL00	Program analysis
RSBDCSUB	Initiates Batch input sessions to run automatically when scheduled
RSDYNL10	List all DYNPROs which belong to a specific ABAP
RSHOWTIM	Displays tips and tricks for ABAP Programming
RSINCL00	Extended program list
RSORAREL	the Oracle Release
RSTXCPFS	Transports SAPscript without transport number
RSTXFCOM	Compares two SAPscript forms
RSTXFCON	Conversion of paper format for SAPscript forms
RSTXFINF	List information about a SAPscript form
RSTXPDFT4	Generates a PDF from any spool
RSTXR3TR	Transports SAPscript with transport number
RSTXSCRP	Transports SAPscript with transport number
RSTXTRAN	Transfer text between clients with transport number
RSUSR006	List users last login

See the SAP ABAP Command Reference book in the Library.

Appendix D: Useful Function Modules

Below is a list of useful functions you may use in your own programs. SAP provides several which you should use as much as possible to avoid redundant code. The functions themselves can be accessed via the Object Repository or the function builder (transaction SE37).
In addition:

- There are some COT custom functions, especially in the CCS area, such as ZUT_ADDRESS_EXTN or ZUT_CCS_GETNAME that have to be used to get the correct data.
- The SAP Manual *Common SAP R/3 Functions* contains an extensive list of generic SAP functions.
- Many CCS functions can be found by looking in SE37 with 'FKK_*' for FICA functions and 'ISU_* ' for Billing and DM functions
- SAP provides standard functions for dates, conversions, screens, office integrations etc. Some of them, however, are being replaces with methods. Therefore the function module's documentation should be checked before use.

Batch Input Sessions (BDCs) (try to avoid using BDCs whenever possible)

BDC_OPEN_GROUP	Creates a new batch input session
BDC_INSERT	Creates a record in a batch input session
BDC_CLOSE_GROUP	Closes the batch input session
BDC_DELETE_SESSION	Deletes the batch input session

Text Processing

READ_TEXT	Reads text from the specified object into an internal table
READ_STDTEXT	Reads standard text into an internal table

Date Processing

DATE_COMPUTE_DAY Determines the day of the week as a numeric value (1-7) of a date specified, for example 01012000 would return '6' (Saturday).

DATE_CONVERT_TO_FACTORYDATE	Determines the factory calendar date from a date specified
DATE_GET_WEEK	Determines the week of the year given to a

	specified date
FACTORY_CONVERT_TO_DATE	Determines date given a factory calendar date
HOLIDAY_CHECK_AND_GET_INFO	Determines if a given date is a holiday
FKK_DTE_ADD_MONTH	Adds a number of months to a date
WEEK_GET_FIRST_DAY	Determines the first day of the week for the week a specified date falls in

Popup Windows

POPUP_TO_FILL_COMMAND_LINE	Displays a popup window for user command input
POPUP_TO_MODIFY_TEXT	Good to enter 1 line text (Fig.1), answer will be J/A. Value1 contains the text entered.
POPUP_WITH_TABLE_DISPLAY	Displays dialog with single column values to pick from (fig.2). 4 parameters for dialog coordinates, 1 parameter for the text in the title bar and itab value tab for the list of values to display. The picked choice is in choice. Returns a value of 0, if cancelled.
POPUP_TO_CONFIRM_DATA_LOSS	Will popup the standard message (see fig.3) Title text can be altered. Answer contains J/N,
POPUP_FOR_INTERACTION	Fig.5. the field ticon is the icon displayed. This could be a Question, Information, or Exclamation.
POPUP_TO_CONFIRM	Fig.6. Buttons + icons + question/title-text are customizable. Cancel button can be hidden. Popup type can be like an ICON_MESSAGE_INFORMATION. This is the message icon. Answer will contain a 1, 2, or a (i.e. cancelled).

POPUP_TO_GET_ONE_VALUE	Same as above but field length is alterable. Also this field is independent of a database field.
POPUP_GET_VALUES	Dialog box for display and request of values from tables(s) in DB, without check. See fig.10, 11 and 12.

File Access (most of these are obsolete, use methods of the standard SAP class CL_GUI_FRONTEND_SERVICES instead)

WS_UPLOAD, obsolete, replaced by: CL_GUI_FRONTEND_SERVICES=>GUI_UPLOAD

WS_DOWLOAD, obsolete, replaced by: CL_GUI_FRONTEND_SERVICES=>GUI_DOWNLOAD

UPLOAD, DOWNLOAD, obsolete.

F4_FILENAME manager support to locate a file in a directory. Database Access	Runs F4 for filename and provides File
ISU_DB_***_SINGLE	Replace the stars with any db table name and get data from transparent tables.

Financial

FKK_SHOW_PAYMENT_USAGE It shows one header document (dfkkko) with line items (DFKKOP).

FKK_COMPLETE_ACCOUNT_READ i_only_open is set, it does not return cleared items.	Use this to get all items for a CA. If flag
FKK_OPEN_ITEMS_FOR_ACC_READ	Use this to get all open items for a CA.
BAPI_ACCOUNT_GETBALANCES	This is useful for a short overview over the account (need BP and CA) in table form.

FKK_GET_CLEARED_ITEMS	Gets all cleared line items for one clearing document.
FKK_BP_LINE_ITEMS_SEL_BY_OPBEL	Gets all items for a specific document

Installment Plan

FKK_S_INSTPLAN_DISPLAY

FKK_S_INSTPLAN_PROVIDE

FKK_S_INSTPLAN_EXISTENCE_CHECK

FKK_S_INSTPLAN_GETDETAIL

FKK_S_INSTPLAN_GETLIST

BAPI_INSTMNTPLN_CREATEFROMDATA

BAPI_INSTMNTPLN_GETDETAIL

BAPI_INSTMNTPLN_GETLIST

BAPI_ISUFINDER_FINDOBJOFDATA

Dunning

FKK_READ_DUNNING_HISTORY

Miscellaneous

AUTHORITY_CHECK_DATASET	Checks whether you are allowed Read, Update or Delete file access.
RZL_SLEEP	Gets application to sleep (wait) for a number of seconds.

AIP9_STATUS_READ This function reads system/user status from any object in SAP db.

SAPGUI_PROGRESS_INDICATOR Set 'Progress Indicator' in current window's status bar. Include title to specify.

WS_EXECUT, obsolete, use CL_GUI_FRONTEND_SERVICES=>EXECUTE instead.

SXPG_COMMAND_EXECUTE Executes external (UNIX) command, see list of commands in SM49.

ISU_ADDRESS_PROVIDE You pass in the address type with its associated key and the function module will return the address. For example, if you specify that the address type is 'C' for connection object and give the object number, the function module will return the connection object address. For FICA mailing addresses, (type 'T' and contract account) always use ZUT_ADDRESS_EXTN to provide the CASS certification.

ISU_STRUCTURE_READ If you know one end of the master data chain (i.e. Contract) and you need another end, (i.e. Premise), just specify the path to follow and give the starting key. For this example, the path is contract to installation, installation to premise (EVER to EANL, EANL to EVBS) and the starting point is the contract number 1000045. The function module will return the associated premise number.

ISU_S* Is the naming convention for a series of function modules that will perform some type of service like displaying entries, updating a table etc.

CLSE_SELECT_AUSP Used to get characteristic values from the classification system for example in the meter reader download form, which uses classification on the equipment record for

such items as ERT frequency and tone.

RSPO_SX_OUTPUT_TEXTDATA	This spools data to a Logical Output Device (e.g. for transfer to another UNIX box), or just for print from ABAP.
ISU_PRINT_EXPANDED	Does a reprint of a bill, just as EA60 but can be called from ABAP (e.g. when you need to do mass re-print).
GUI_GET_DESKTOP_INFO	Gets info about the front-end. Not sure whether this really works, use methods of Class CL_GUI_FRONTEND_SERVICES instead.
SAPSCRIPT_IMPORT_GRAPHIC_BDS	Upload of graphic file into SAP repository, same as transaction SE78.

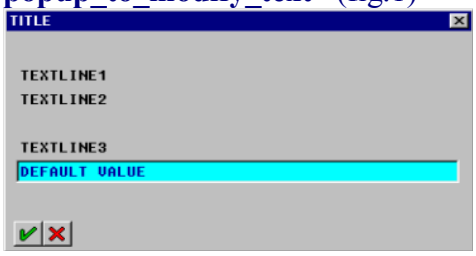
Use BAPI_USR01DOHR_GETEMPLOYEE and BAPI_EMPLOYEE_GETDATA. Function module ZUT_GET_USER_DETALS is buggy.

GET_COMPONENT_LIST	Returns the field names of a given structure or internal table + data type.
GET_TEXT_PRINT_PARAMETERS	Pops up the print dialog
VIEW_MAINTENANCE_CALL	Call the maintenance transaction program which was created by the table maintenance generator. Pass Action Code (e.g. “U” for update) and the table name (as if you were in SM30).
RSPO_FRONTEND_PRINTERS_FOR_DEV	Retrieves a list of printers defined on the local machine, also tells which on is set as default printer.
FTP_CONNECT	Connects to FTP server. Can use in combination with FTP_R3_TO_SERVER and FTP_SERVER_TO_R3 to transfer files from and to (SAP / UNIX).

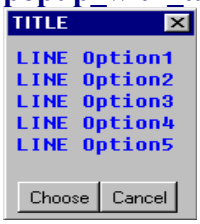
CONVERT_ABAPSPOOLJOB_2_PDF	Converts spool output to PDF
SO_NEW_DOCUMENT_ATT_SEND_API1	Use this to send anything to fax/email/pager etc. Provided that the SCOT settings are ok (done by BASIS).
ZUT_CREATE_CONTACT	Create a Contact on the Business Partner, it is a simpler version compared to the standard SAP function module.
ZUT_EMAIL_BP	Send an email to a Business Partner or any email address specified in the input.
ZUT_NEXT_COORDINATOR	Finds next coordinator to fill position.
RSEC_GENERATE_PASSWORD	Generates a random number of any length.
EPS_GET_DIRECTORY_LISTING	List files from UNIX dir. It is our standard to call function module SXPG_COMMAND_EXECUTE with parameter command name set to 'ZLS'.

Screenshots For Popup Function Modules

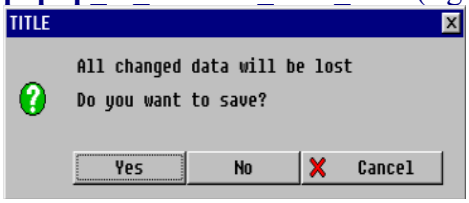
popup_to_modify_text (fig.1)



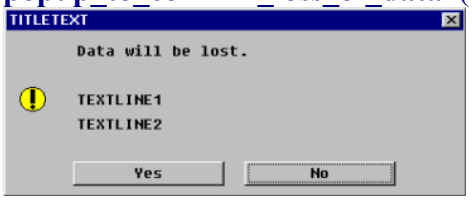
popup_with_table_display (fig.2)



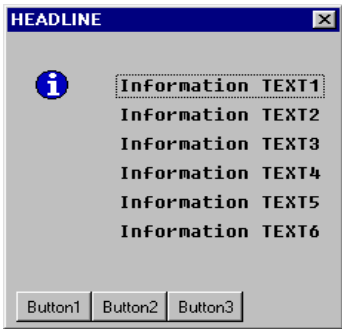
popup_to_confirm_data_loss (fig.3)



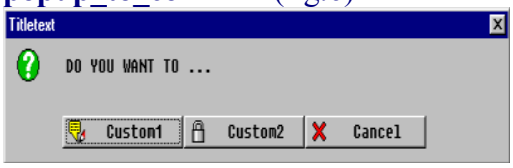
popup_to_confirm_loss_of_data (fig.4) obsolete, to be deleted



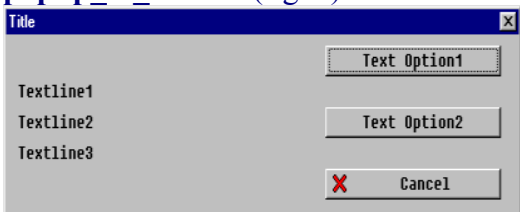
popup_for_interaction (fig.5)



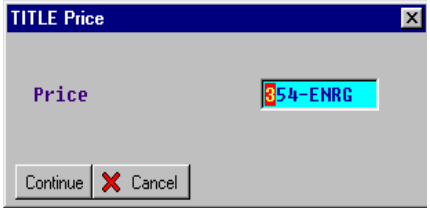
popup_to_confirm (fig.6)



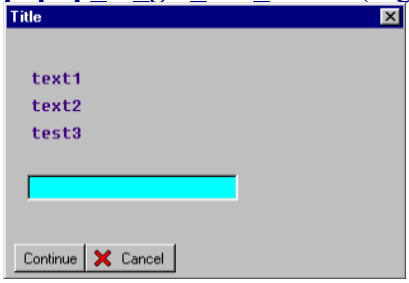
popup_to_decide (fig. 7) obsolete to be deleted



popup_to_get_value (Fig.8) obsolete to be deleted



popup_to_get_one_value (Fig. 9) obsolete to be deleted



popup_to_get_values (Fig. 10)

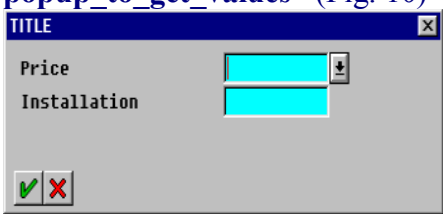


Fig.11

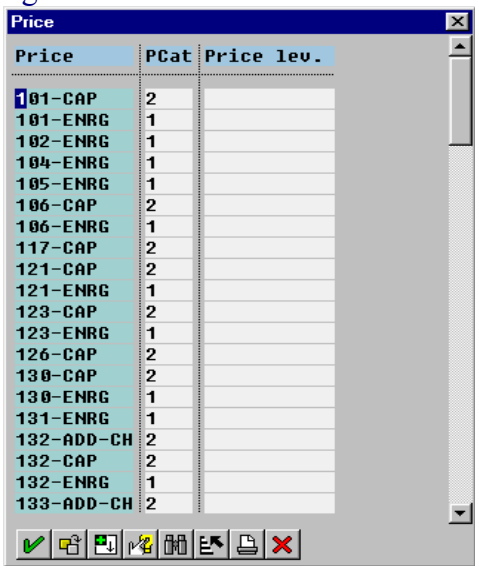


Fig.12

Appendix E: Error Handling

Message Management ____

Messages are single texts, stored in table T100, that can be maintained in Transaction SE91 or by forward navigation in the ABAP Workbench. T100 has the following structure:

Language key
Twenty-character message class
Message number
Message text (up to 72 characters)

Message Types

A	Termination	The message appears in a dialog box, and the program terminates. When the user has confirmed the message, control returns to the next-highest area menu.
E	Error	Depending on the program context, an error dialog appears or the program terminates.
I	Information	The message appears in a dialog box. Once the user has confirmed the message, the program continues immediately after the MESSAGE statement.
S	Status	The program continues normally after the MESSAGE statement, and the message is displayed in the status bar of the next screen.
W	Warning	Depending on the program context, an error dialog appears or the program terminates.
X	Exit	No message is displayed, and the program terminates with a short dump. Program terminations with a short dump normally only occur when a runtime error occurs. Message type X allows you to force a program termination. The short dump contains the message ID.

For “Predefined Treatable Exceptions”, please refer to our books “The Official ABAP Reference” and “ABAP Objects: The Official Reference”.

Online Transactions

Online transactions should have their error messages displayed in the status bar of the standard SAP GUI. This is most easily done with a MESSAGE statement with the TYPE parameter set to 'E'. Using the message type 'E' will make the status line flash bright red, and then display the error message. Consult the MESSAGE statement (cursor on it, in ABAP editor and press F1) documentation for the exact behavior under possible contexts and message types.

The least disruptive message type is 'I', for 'information', and it only displays the message and resumes normal running. The most disruptive message type is 'X', which causes a short dump, listing the message ID, Number, and parameters in the short dump.

Call Transaction

When using Call Transaction statements, include the MESSAGES addition and process the MESSAGE records returned. Usually this will mean looping through the message list, and passing each message to a MESSAGE statement.

Here is an example:

```
DATA:
  t_bdc     TYPE TABLE OF bdcdata,
  t_message TYPE TABLE OF bdcmsgcoll.

FIELD-SYMBOLS: <fs_message> TYPE bdcmsgcoll.

CALL TRANSACTION 'XD01' USING t_bdc
 MODE 'N' MESSAGES INTO t_message.

LOOP AT t_message ASSIGNING <fs_message>.
  MESSAGE
   ID <fs_message>-msgid
   TYPE <fs_message>-msgtyp
   NUMBER <fs_message>-msgnr
   WITH
     <fs_message>-msgv1
     <fs_message>-msgv2
     <fs_message>-msgv3
     <fs_message>-msgv4.
ENDLOOP.
```

Error Return from BAPI

BAPIs do not set SY-SUBRC since they are meant to be called from outside of the SAP ABAP environment. Instead, they return errors via a table based on the structure BAPIRET2. Field TYPE will be either initial or set to the character 'S' if there are no errors. Otherwise, standard ABAP error types are used (such as A or I). Other fields in this structure duplicate the error message fields in the system table (SY-MSGID for example) and may or may not be filled.

After a call to a BAPI, this table should always be examined.

Application Log

If an end-user will not handle the error immediately, and there may be many errors generated, then you should store the errors in the Application Log. This way the end-user can come back to them later, and work through them. This is typical for batch processes like the nightly jobs. The batch jobs run to completion, and error messages from any transactions that were processed are stored in the application log. They are then reviewed the next day. See Appendix J: Application Logging, for more details on how to insert application logging in your application.

Added 6/12/2017

These 2 fields should be populated when writing application logs.
ALDATE_DEL - This should be populated as sy-datum + 365 days (max).
DEL_BEFORE - This should be set to 'X' so that the application log will be deleted by the cleaning program after the expiration date.

Application error log post example:

```
CALL FUNCTION 'BAPI_MESSAGE_GETDETAIL'
  EXPORTING
    ID                =    sy-msgid
    NUMBER            =    sy-msgno
    LANGUAGE          =    SY-LANGU
    TEXTFORMAT        =     'ASC'
    MESSAGE_V1        = sy-msgv1
```

```
    MESSAGE_V2       = sy-msgv2
    MESSAGE_V3       = sy-msgv3
    MESSAGE_V4       = sy-msgv4
  IMPORTING
    MESSAGE          = message.
```

Class Based Error Handling

SAP provides several exception classes for error handling. Use these whenever possible. Error classes are used in a TRY/CATCH/ENDTRY block. A list of SAP error classes can be found by typing CX* into transaction SE24.

Some of the common error classes are:

CX_SY_FILE*: this group of error classes deals with file access. Examples are the error classes CX_SY_FILE_OPEN, when a file to be opened is already open, or CX_SY_FILE_AUTHORITY when there is no permission to open a file.

CX_SY_ZERODIVIDE captures division by 0 errors.

CX_SY_OPEN_SQL_DB captures SQL errors.

Whenever there is a possibility that the program could throw an exception, error handling is mandatory.

Appendix F: Reuse Library (BC-DWB-UTL)

The Reuse Library is a transaction in the R/3 System that helps developers when searching for reusable software objects (transaction code SE83).

In the Reuse Library reusable objects ('Reuse products') are displayed in a browser that allows you to navigate through these products. When you double-click on a Reuse product in the tree displayed on the left-hand side of the browser, the data to this Reuse product is displayed on the right-hand side.

We define a Reuse product as a number of repository and information objects that deal with the same subject matter.

The ALV Grid Control tool is a Reuse product that is made up on a class, a number of function modules, example programs, documentation elements, and so on.

The collection of information has been categorized appropriately and the individual categories presented on different tabs (Documentation, Examples, Program objects).

"Documentation" Tab

The documentation contains detailed information about a Reuse product that you can consult during the familiarization with the product and for any questions about the product that may arise.

"Examples" Tab

The examples for a Reuse product should, in simple scenarios, illustrate how the Reuse product can be used. In this way developers can see what the product looks like 'live' (the examples can be started directly from the Reuse Library) and copy any useful passages (editor can be accessed directly). If documentation to the examples exists, you can display this immediately.

"Program Objects" Tab

During familiarization with, or for repeated use of, a product it is important to have fast and clear access to the repository objects to be included in your coding. You can display and (if possible) also test the objects from the Reuse Library. You can also access the documentation to the objects directly. The objects can also be copied to the workbench work list and used later, for statement templates, for example.

11.1.1.1 Integration in the Workbench

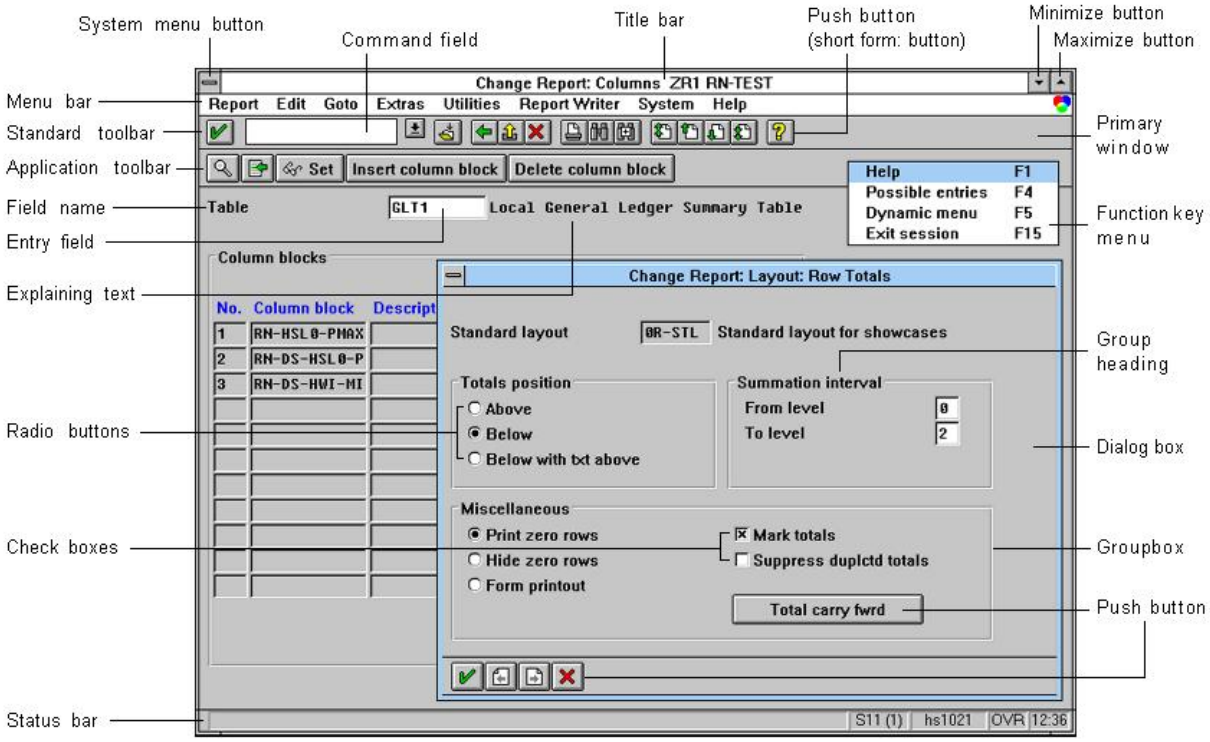
You can call the Reuse Library from the ABAP Development Workbench (Environment → Reuse Library). You can also call the Workbench from the Reuse Library (Environment → Workbench).

You can copy the objects from the 'Examples' and 'Program objects' tabs to the Workbench work list. This is a very simple method for copying function modules into your coding from the Reuse Library, for example. To do this:

- Call the Reuse Library (for example, from the Workbench).
- Go to the Reuse product you require, choose one of the tabs and select a function module.
- In the application toolbar choose Add to work list. The function module is then displayed in the bottom part of the screen in the work list. You can add as many objects as you like to the work list.
- Return to the workbench. You can still see the work list in the bottom part of the screen.
- Using drag & drop you can now include the objects from the work list in your coding as statement templates.

Appendix G: Object names of GUI interface

Still confused about the naming of objects on the SAP screen? Worry no longer. Here is the answer. Most of it is standard windows anyway.



Appendix H: Useful Transactions

ABAPDOCU	ABAP documentation
BCY2	Y2K Check
CAA2	Contract Account
DB20	Update statistics
E41H	Create MRU
EA30	Rates (also EA31, EA32)
EA35	Schema (also EA36, EA37)
EA47	Discounts/Surcharges (master data)
EA50	Operands (also EA52, EA53)
EA53	Rate Category (also EA54, EA55
EA56	Maintain Rate types
EA61	Budget Billing Plan (also EA61, EA62)
EA87	Rate Determination
EA89	Prices (master data) (also EA90, EA91)
EC20	FrontOffice
EFCS	Form Class
EFRM	Application Form
EG02	Device Category
EG31	Final Connection (Device → Location)
EG33	Technical installation of device
EG34	Billing installation of device
EG71	Display Rate Data
EL40	Street Route for MRU
ES30	Create Installation
ES55	Create Connection Object
ES60	Create Premise
ES65	Create Device Location
IQ02	Material Change
IW52	Notification
SA38	Running program in background
SARA	Mass archiving of SAP objects
SCC1	Copy as per Transport Request from diffe
SCID	Code Inspector
SE11	Data Dictionary
SE16	DB browser
SE30	Runtime analysis (tips: F6)
SE32	Text Elements
SE36	Log DB
SE37	Func. Modules
SE38	Editor
SE39	ABAP source compare
SE54	Create maint. prg for view
SE71	Form (Script)
SE81	SAP Application hierarchy
SE84	Repository Browser
SE91	Message Classes
SE93	SAP Transaction codes
SLG1	Evaluate application log
SLIN	Extended Program Check
SM02	Remove locks from USER objects
SM04	Running Transactions + easy kill
SM30	Table maint. trans. (also SM31)
SM35	View Batches / BDC Recording
SM38	Backgr. job processing
SM50	Running processes
SM51	Server overview + tasks
SNRO	Number Ranges
SO01	Mail Inbox (CCS billing / Invoicing)
SO10	Text Objects
SPAU	Modif-adjust (ABP, Interf, scr,matchc,view, lock obj)
SPDD	Modif-adjust (Domains, data elem, tables)
SPRO	IMG Customizing
STUN	System monitoring
SU01	User maint.
SU53	Author. Screen (print after Auth. Fail)
SWLD	Workflow maintenance screen
TJ30	User Status

Appendix I: Useful SAP tech websites

www.kabai.com/abaps/q.htm
www.sapassist.com
www.saptechjournal.com
www.sapfans.com
www.planetsap.com
www.sapgenie.com/abap/
www.sappoint.com
www.hernangn.com.ar/sap.htm
www.abapprogramming.net
www.sapdevelopment.co.uk/tcodes/tcodes.htm
www.saptechies.com
http://www.easymarketplace.de/
www.google.com

Appendix J: Application Logging

Application logging is an important addition to any custom application written in SAP. It is mainly used in batch applications, so that information or error messages can be stored and viewed later. It can also be used for online transaction applications to register important changes made, by who and when. An application log entry consists of one main log-entry entry and one or more log lines. Transaction SLG1 is used for viewing the application log. Creating log entries has been made very easy with the help of a developed include file: ZN_UT002. You can make use of the following macro's to create all the log entries you need:

1. LOG_NEW
2. LOG_ABORT
3. LOG_ERROR
4. LOG_WARNING
5. LOG_INFO

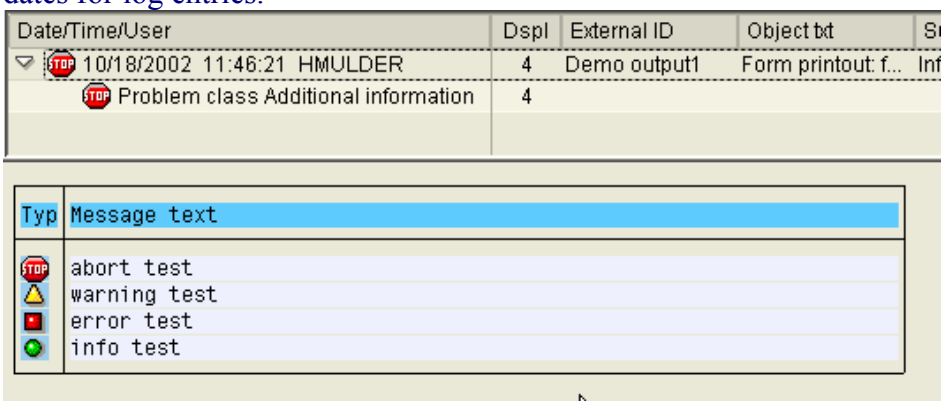
The first entry is required to create the initial log. After that the option is to create as many log lines as required, selecting from either number 2,3,4 or 5, depending on the type of action to log.

Example code:

```
REPORT yr_log_example.
INCLUDE zn_ut002.
START-OF-SELECTION.
LOG_CREATE 'IUFC' 'INFO' 'Demo output1'.
LOG_ABORT 'abort test'.
LOG_WARNING 'warning test'.
LOG_ERROR 'error test'.
LOG_INFO 'info test'.
```

This will result in the log below. Important: the entire log-alert level (the icon) will get the highest alert level of the detail log lines (in this case the ABORT (stop sign)).

IMPORTANT: ZN_UT002 needs to be reworked as soon as possible to exclude expiration dates for log entries.



Use the LOG_ABORT if the application is about to terminate (when message type A is used).
Use the LOG_ERROR if a serious error occurred in the application but it is still capable of proceeding with the remainder of the tasks.
Use the LOG_WARNING if the application needs log warnings
Use the LOG_INFO if the application needs to log useful information. This can also be handy when you need to check all sorts of information/variables during testing of a program which runs in background (where debugging is more difficult).

Appendix K: Macros

Some of the macros can be found in the include file: ZN_UT001. Below a list of the most important ones:

INC <x>	Increases the value x with 1
DEC <x>	Decreases the value x with 1
ERASE <x>	Does a CLEAR and REFRESH of internal table x.
LOOP _ITAB <x>	Displays the contents of internal table x in a report style format (mainly for testing purpose)
LOOP_ITAB_DYNAMIC <x>	Displays the contents of internal table (name of the table is the value of variable x) in a report style format (mainly for testing purpose)
SPLIT_DELIMITED	Split command just that it uses the Microsoft Convention of using Text delimiters
SPLIT_DELIMITED_CHECK	Same as SPLIT_DELIMITED but with additions error checking
CONCAT	Concatenates any type variable (also number-variable) and moves the result to global variable GC_TEXT (already declared in the INCLUDE file)
CONCAT_SP	Same as CONCATE but is “separated by space”.

Appendix L: Acronyms

ABAP	Advanced Business Application Programming
ASUG	Americas' SAP Users' Group
BADI	Business Add In
BAPI	Business Application Programming Interface
BC	Business Connector
BDC	Batch Data Conversion
BI	Business Intelligence
BOR	Business Object Repository (SW01)
BPEL	Business Process Execution Language (for Web Services)
BPM	Business Process Management
BPX	Business Process Expert
BSP	Business Server Page
BW	Business Warehouse
CAF	Composite Application Framework
CCMS	Computing Center Management System
(CATS)	SAP's Cross Application Time Sheet Module
(CS)	SAP's IS-U/CCS Customer Service Module
DCL	Data Control Language
DDL	Data Declaration Language
(DM)	SAP's IS-U/CCS Device Management Module
DML	Data Manipulation Language
DSAG	Deutschsprachige SAP Anwendergruppe (German-Speaking SAP User Group)
EAI	Enterprise Application Integration
(ESS)	SAP's Employee Self Service Module
EDI	Electronic Data Interchage
EP	Enterprise Portal
ERP	Enterprise Resource Planning
ETL	Extract Transform and Load
(FI-CA)	SAP's IS-U/CCS Finance Module
(FI-AA)	SAP's Asset Accounting Module
(FI-AR)	SAP's Accounts Receivable Module
(FI-AP)	SAP's mySAP Accounts Payable Module
(FI-CO)	SAP's Controlling Module
IS-PS	Industry Solution – Public Sector SAP's industry specific solution for public sector management
IDoc	Intermediate Document
IS-U/CCS	Industry Specific Solution for Utilities - Customer Care & Service

JCA	J2EE Connector Architecture
JCo	Java Connector
LSMW	Legacy System Migration Workbench
LUW	Logical Unit of Work
MaxDB	SAP's Database Technology
(MM)	SAP's Materials Management Module
SAP ERP	Integrated enterprise resource planning (ERP) software manufactured by SAP AG
NW	Net Weaver
PAI	Process After Input (SAP Screen Processing Event)
(PE)	SAP's Training & Event Management Module
(PY)	SAP's Payroll Module
(PT)	SAP's Personnel Time Management Module
(PA)	SAP's Personnel Management Module
PBO	Process Before Output (SAP Screen Processing Event)
(PM)	SAP's Plant Maintenance Module
(PS)	SAP's Project Systems Module
RFC	Remote Function Call
SAP	Systems, Applications, Products
(SD)	SAP's Sales & Distribution Module
SAP R/3	SAP's integrated software solution for client/server and distributed open systems
SDN	SAP Developer Network
SLD	System Landscape Directory
SMTP	Simple Mail Transfer Protocol
SOA	Service-Oriented Architecture
SOAP	Simple Object Access Protocol
TLA	Three Letter Acronym
TCode	Transaction Code
TMS	Transport Management System
(WF)	SAP's Cross Application Workflow Module
XI	Exchange Infrastructure

Appendix M: ABAP Performance Guide

Tools provided for Performance Analysis

- **Run time analysis transaction SE30**

  This transaction gives all the analysis of an ABAP program with respect to the database and the non-database processing.

- **SQL Trace transaction ST05**

  The trace list has many lines that are not related to the SELECT statement in the ABAP program. This is because the execution of any ABAP program requires additional administrative SQL calls. To restrict the list output, use the filter introducing the trace list.

  The trace list contains different SQL statements simultaneously related to the one SELECT statement in the ABAP program. This is because the R/3 Database Interface - a sophisticated component of the R/3 Application Server - maps every Open SQL statement to one or a series of physical database calls and brings it to execution. This mapping, crucial to R/3s performance, depends on the particular call and database system. For example, the SELECT-ENDSELECT loop on the SPFLI table in our test program is mapped to a sequence PREPARE-OPEN-FETCH of physical calls in an Oracle environment.

  The WHERE clause in the trace list's SQL statement is different from the WHERE clause in the ABAP statement. This is because in an R/3 system, a client is a self-contained unit with separate master records and its own set of table data (in commercial, organizational, and technical terms). With ABAP, every Open SQL statement automatically executes within the correct client environment. For this reason, a condition with the actual client code is added to every WHERE clause if a client field is a component of the searched table.

  To see a statement's execution plan, just position the cursor on the PREPARE statement and choose Explain SQL. A detailed explanation of the execution plan depends on the database system in use.

Appendix N: Use of Oracle SQL Developer – Query Tool

Be sure to but a "**Z_**" as the first part of your username, as we discussed in the meeting/demo last Friday.

Please contact Michael Frank with any SQL Developer specific questions; and Scott Chase with any user/password and SQL development & tuning/optimization questions.

BIG Item. No one is to run a direct query against the SAP PRD system without e-mail approval from their respective 'Lead'.

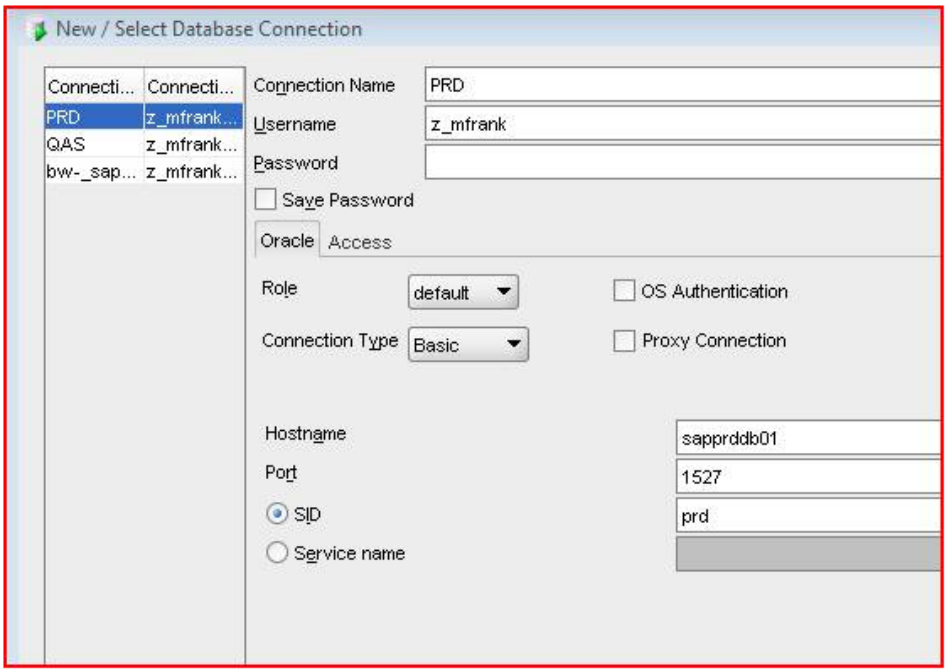
Below is the folder to install the Oracle SQL Developer tool, which allows you to query the Oracle tables directly. The installation is pretty easy, but once it's done you'll need to set up connections to your databases of choice (PRD & QAS). I have included a screenshot to my connection settings. Go ahead and mirror them, using the login Scott will provide you, and you should be good to go.

Some items to keep in mind:

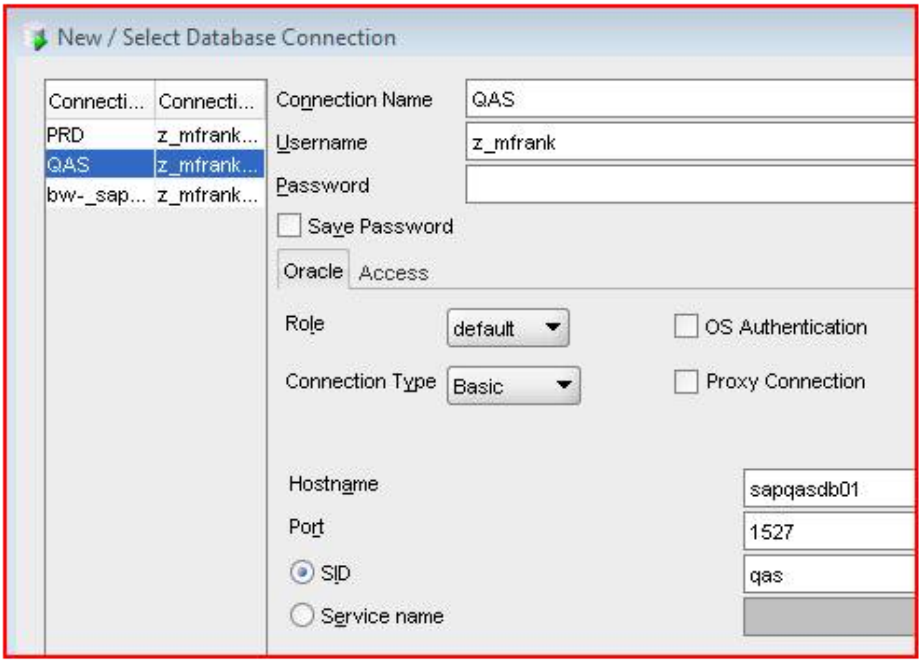
1) The SAP tables can be found under the heading "Other Users", and then the respective system (SAPPRD or SAPQAS).
2) When you drag a table out to the query window, you'll need to add the system name right after the FROM statement, for example,
   SELECT * FROM Cow should become
   SELECT * FROM SAPPRD.Cow
3) I have not found a way to change my password from within SQL Developer, so you'll either need to sit with Scott and type in a new one using his Oracle tools, or find a way to do it in SQL Developer and share it with the group.
4) Try to run your queries against QAS unless there is a true need to run them against PRD. This will make everyone's life better.

V:\SAPTechnical\sqldeveloper\sqldeveloper.exe

PRD


New / Select Database Connection
Connecti...
Connecti...
PRD
z_mfrank...
QAS
z_mfrank...
bw-_sap...
z_mfrank...
Connection Name
PRD
Username
z_mfrank
Password
Save Password
Oracle
Access
Role
default
OS Authentication
Connection Type
Basic
Proxy Connection
Hostname
sapprddb01
Port
1527
SID
prd
Service name

QAS


New / Select Database Connection
Connecti...
Connecti...
PRD
z_mfrank...
QAS
z_mfrank...
bw-_sap...
z_mfrank...
Connection Name
QAS
Username
z_mfrank
Password
Save Password
Oracle
Access
Role
default
OS Authentication
Connection Type
Basic
Proxy Connection
Hostname
sapqasdb01
Port
1527
SID
qas
Service name

Updates 5/7/2015

1) When updating related tables, tables should not be updated independently of one another. All table updates should be bundled together and updated through 'Update Function modules'.
This follows SAP's best practice of updating all dependent tables or none of them in one logical unit of work.
Refer to the FM 'ZFM_P_PROCESS_BATCH' which updates all the tables through an update function module 'ZFM_I_UPDATE_TABLES'.

2) When you want to generate sequential numbers to be updated in tables, try to create number ranges and get the new sequential numbers using FM 'NUMBER_GET_NEXT'. If random values are required, try to use Method of class CL_SYSTEM_UUID which would create 16, 22 or 32 character GUIDs.

3) When updating database tables, don't update the tables inside loop. Collect all the entries in an internal table and update them after the loop with 'INSERT (dbtab) FROM TABLE (itab) or 'UPDATE (dbtab) FROM TABLE (itab)' or 'MODIFY (dbtab) FROM TABLE (itab)'.

4) Use of native SQL should be avoided.

Updates to creating interfaces:

With the new position 'Interface Architect' added to the team, all the interfaces project needs to include the interface architect in their interface design. Interface architect will help in architecting interface projects with the idea of reducing redundant interfaces built for the same kind of functionality and adapting out best practices.

All the new interface projects should try to leverage SAP PI as their first choice for interfacing with other systems. Any exception to this should be approved by the leads.

Links to PI standards:

PI naming standard
PI spec template

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City of Tacoma
SAP Development Naming Standards

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REVISION HISTORY

Revision Number	Revision
2.3 30 Jun 09	Bryan Pierce: 1) Added TQAC (5.1.1) 2) Added Logical File Name & Paths (5.9.13 & 14) 3) Updated TOC reference numbers to auto sequence to make adding material easier and also creating the TOC easier.
2.4 19 Nov 10	Sandi Wentworth 1) Removed "Client" from Print Workbench standards (3.8) 2) Added Include Naming standard to ABAP Program area (3.6)
2.5 8/20/14	Ramesh Mohan Added new naming conventions. Added new guidelines for cloning objects.
2.6 4/26/17	Ramesh Mohan Added standars for CDS Added standars for Email sub-domain
3.0 12/7/2017	Bryan Pierce • Updated document formatting to use heading formats so that navigation view works. Other formatting updates for document flow. • Updated CDS standards • Removed TQAC as it is obsolete • Rebuilt Table Of Contents • Updated front page format to allow standard Title format • Moved some items that were under 'Other Objects' to other places in the document where more appropriate. Such as classes are up towards the top near other development objects.

OBJECTIVE

Using consistent development standards and naming conventions through SAP technical development will contribute significant time and resource savings. Standards will benefit initial construction, long term maintenance, and upgrade of the SAP system and improve system efficiency dramatically.

The objective of this manual is to define guidelines for the SAP Technical Team. The standards defined in this document should be adhered to in writing ABAP reports, dialogue programs, transactions, function modules, workflows, print workbench, and any other relevant technical development in the SAP ABAP/4 environment.

1.1 CLONING SAP STANDARD OBJECTS

Cloning SAP standard objects should try to be avoided. We should try to use the enhancements and other tools which would help us to extend SAP standard functionality, should be considered first. Any new clone requests should be informed and approved by Manager/supervisor .

NAMING CONVENTION

1.2 DOCUMENTS

1.2.1 Technical Specifications

<needs standard entered>

1.3 MODULE ID

Since a number of different SAP modules have been implemented, Module ID is used to group related programs and development objects together. They may also be used to give a distinct signature for interface control logic, reporting, and data file names.

The list of Module ID's is as follows:

Application Function	Module ID	Module Description
ISU - CCS		
	FI	Contract Accounts Receivable and Payable
	DM	Device Management
	BI	Billing
	CS	Customer Service
HRMS		
	PY	Payroll
	PT	Personnel Time Management
	PE	Training and Event Management
	PA	Personnel Administration
	ES	Employee Self-Service
	CA	Cross Application Time Sheets
FMAS		
	PU	Public Sector
	FE	Federal Energy Regulatory Commission
	GL	General Ledger
	CO	Controlling
	CF	Corporate Finance Management
	AR	Accounts Receivable
	AP	Accounts Payable
	AA	Asset Accounting
WMS		
	SM	Service Management
	SD	Sales and Distribution
	PS	Project Systems
	PM	Plant Maintenance
	MM	Materials Management
	MD	Mobile Data Systems Integration
	GI	Geographic Information Systems Integration
	PR	Purchasing
	LE	Logistics Execution
BI-BW		
	BW	Business Warehouse
UTILITY		
	UT	Technical Utility Programs to Support Implementation Development
BASIS	BC	Basis components

If it appears that a specific development object cannot be appropriately classified by the current list of Module ID's, a new one should be requested from the Development Team Lead.

1.4 DEVELOPMENT CLASS

Development classes group together development objects (e.g. programs, tables, function modules) which can be corrected and migrated together across instances. A development class can, for example, consist of a transaction or a group of related transactions along with programs, DDIC objects, menu painters, screen painters, lock objects, message classes, etc.

Development Class	Description
Z_CCS	ISU CCS
Z_HRMS	Human Resources
Z_WMS	Works Management
Z_FMAS	Financial Management System
Z_BW	Business Warehouse
Z_UTILITY	Technical Utility
$TMP	Local Object (Not transportable)

If a developer believes that a unit of work is significant and deserves its own development class, then an additional development class may be required. The developer should request an additional development class from the Development Team lead.

Temporary objects may be assigned to class '$TMP'. Objects defined under the $TMP development class may be periodically deleted, may not be backed up, and will not be migrated.

1.5 NAMESPACE

The namespace of SAP custom development should be 'Z' for production program or 'Y' for test/temporary development.

1.6 CHANGE REQUEST (TRANSPORT DESCRIPTION)

The sequence number identifies of the version of a specific development. Sequence numbers increment starting from #1. As any new requests are created for the same development effort the previous request should be rolled into the new request and the name should reflect the new sequence number.

<Application Function>:<Development Id or Module Id> <Project Number> <Short Description> #<Sequence Number>

Example:
WMS: ITR-PM702 35451206 Update GIS Logic #1

<Application Function> = WMS
<Development Id or Module Id> = ITR-PM702 or PM702
<Project Number> = 35451206
<Short Description> = Update GIS Logic
<Sequence Number> = 1

1.7 ABAP PROGRAM

1.7.1 Program Naming

The first character of a custom ABAP program name should begin with a 'Z' for production program or 'Y' for test/temporary program. The next character represents the program type ID (See below). The next two characters identify the Module ID. The last 3 characters should comprise of the tracking ID number which is used in the functional or technical specification.

Include a Program Type ID in the comment box at the top of your program. Possible values for Program Type ID are listed below.

Program Type ID	Description
V	Conversion
D	Data Dictionary Maintenance
E	Enhancement
I	Inbound Interfaces
O	Outbound Interfaces
M	System Maintenance
N	Include Program
R	Report
S	SAPscript Print Program
W	Data Warehouse

All programs should adhere to the following naming convention:

<Namespace><Program Type ID>_<Module ID><Tracking ID>_< Short Description>

Note: Short Description is required except in the case of data conversion only. For example, Data Conversion programs are mostly based on the migration/business objects. Depending on what the actual task Data Conversion program is doing, there might be multiple programs on the same object, e.g. a program for mapping, a program for importing, etc. If needed, migration/business object and the task of the program can be appended as the short description to the end of program name.

Note: If creating an Include, add to the end of the naming convention the Include's function purpose. E.g. The Top Include used for data declaration should be followed with _TOP, or the selection screen follow with _SEL

Example:
ZR_FI001_BUDGET_BILLING_MRU
Where:
Z = Namespace
R = Report
FI = Module ID (FI for Contract accounts receivable and payable)
001 = Tracking ID (Same Tracking ID used in Functional/Technical Spec)
BUDGET_BILLING_MRU = Short Description

ZV_DM001_DEVICEIMPORT
Where:
Z = Namespace
V = Data Conversion
DM = Module ID (Device Management)
001 = Tracking ID (Same Tracking ID used in Functional/Technical Spec)
DEVICEIMPORT = Short Description

Include Example:
ZN_DM001_DEVIMP_TOP
Where:
Z = Namespace
N = Include Program
DM = Module ID (Device Management)
001 = Tracking ID (Same Tracking ID used in Functional/Technical Spec)
DEVIMP = Short Description
TOP = Function of Include

1.7.2 Program Variables (Fields)

The program variables should use the following prefixes:

<Scope><Vartype>_<Description>

Scope	Description
A*	Argument
G*	Global (data available throughout an entire program)
W* or L*	Working Data (local to method, forms, or function modules, etc)
C*	Constant
P*	Parameter
M*	Stored/Exported to memory variable
S*	Select-Options
T*	Type
TT*	Type xxx, Type Table of xxx
<FS*	Field Symbols

Vartype	Description
C	Character
S	String
D	Date
F	Floating Point Number
I	Integer
N	Numeric Text
P	Packed Number
T	Time
X	Hexadecimal
STR	Structure
TBL	Internal Table

1.7.3 Program Variants

The program variants have a maximum of 14 characters and they should conform to the following naming standard:

<Description><Suffix>
Example:
CompCode5000
Where:
CompCode = Description
Suffix = 5000

1.7.4 Module Pool Names

ABAP module Pools:
Module pool names can be up to 30 characters long and must begin with 'SAPM'. The next characters should be identical to the primary transaction code for the module pool.

SAPM<Namespace><Module ID><Tracking ID>

Example:
SAPMZFI001
Where:
Z = Namespace
FI = Module ID (FI for Contract accounts receivable and payable)
001 = Tracking ID (Same Tracking ID used in Functional/Technical Spec)

Module Pool Components:
Naming conventions for Module Pool components must also adhere to SAP standards. See table below for detailed conventions using the above example.

NOTE: ## - Numeric between 00 and 99.

Module Pool Component Type	Naming Convention
Data Definition (Global Data Include) Module	M<Name Space><Module ID><Tracking ID>TOP
Process Before Output (PBO) Module	M<Name Space><Module ID><Tracking ID>O##
Process After Input (PAI) Module	M<Name Space><Module ID><Tracking ID>I##
Performs (subroutines)	M<Name Space><Module ID><Tracking ID>F##
Process On Help-Request (POH) Module	M<Name Space><Module ID><Tracking ID>H##
Process On Value-Request (POV) Module	M<Name Space><Module ID><Tracking ID>V##

Okcode	OKcode<screen number>
Forms for OKcode functions	Form_<Okcode>
Authorization Objects	Consult Basis group

1.7.5 Dynpros (Screen)

The identification of a screen painter dynpro consists of an ABAP program name and a 4-digit dynpro number. Use 9000 for initial screen and increment by 100 for the next screen.

GUI Status & GUI Title:
Use the same 4 digits dynpro number for GUI status and GUI title of each screen.

GUI Status – STATUS_<Screen number >
GUI Title – TITLE_<Screen number>

Example:
Use GUI status STATUS_9000 for screen 9000.

Function Key:
Function keys are part of the GUI status and are defined in the menu painter along with pushbuttons and menu items. SAP has certain standard settings for some function keys, listed below:

F1 Help
F2 Choose
F3 Back (one step)
F4 Possible entries
F9 Select
F10 Jump to menu bar
F11 Save/Generate
F12 Cancel
Shift-F1 Print
Shift-F2 Delete
Shift-F5 Open

SAP also uses the following function keys for scrolling:

Shift-F9 First Page
Shift-F10 Previous Page
Shift-F11 Next Page
Shift-F12 Last Page

1.7.6 Transaction Codes

A transaction code can be up to 20 characters. The naming convention for transactions requires the first character be a 'Z'.

<Namespace><Module ID><Tracking ID>

Example: ZFI001

Where:
Z = Namespace
FI = Module ID (FI for Contract accounts receivable and payable)
001 = Tracking ID (Same Tracking ID used in Functional/Technical Spec)

The Functional should check with the business users on final transaction code.

1.7.7 Message Classes

A message Class can consist of a 20 character name. Each message in that class has a 3 digit message number. If there is a need to create new message class, please first check if that Business Process Message Class exists. If it is not suitable to your development then you may create class with the name based on the Development ID. The message number is open to any number between 000 and 999. You can add messages to a message class but do not change existing messages.

Message Class	Description
Z_CCS	ISU CCS
Z_HRMS	Human Resources
Z_FMAS	Financial Management System
Z_WMS	Works Management
Z_BW	Business Warehouse
ZPM700	Plant Maintenance (which would encompass all of associated 70# developments.
ZPM702	Plant Maintenance - 702

Example:
Message class 'Z_CCS' Type 'E' Number '001'.

1.8 ABAP DICTIONARY

Creation of custom DDIC objects should be kept to a minimum to avoid unnecessary maintenance efforts and should cater to specific functional requirements that are not met in the SAP-supplied ABAP Dictionary.

The following are the points to be kept in mind during definition of DDIC objects:

- Foreign keys referencing SAP table primary keys are highly recommended.
- Table maintenance facility (SM31, SM30) should be encouraged only if data security is not highly critical.
- Documentation at the data element level should make use of the long text facility to make on-line help effective.
- For master data or transactional tables, the user names of the persons who created and/or changed data and the date of creation/change should also be stored.
- Technical settings should be maintained on all custom tables created (Consult the BASIS team for assistance with the technical settings).

The maximum length for an object in the data dictionary is 30 characters. However, depending on the object type the maximum length allowed may be less than 30 characters. The following section will describe the requirements for different data dictionary objects.

1.8.1 Tables, Structures and Views

Dictionary table and view names must be no more than 16 characters in length (including the namespace), while structure names can be up to 30 characters in length (including name space). It is recommended that structure names are kept to less than 20 characters.

Table Type	Description
TBL	Table
STR	Structure
VW	View

The following naming standard applies for tables, structures and views:

<Namespace><Table Type>_<Short Description>

Example:
ZTBL_TEST
Where –
Z = Namespace
TBL = Transparent Table
TEST = Description

1.8.2 Domains

The maximum length of a domain is 30 characters. The first character must be 'Z' for production and 'Y' for test domain. Followed by 'DOM_' and the remaining characters can be arbitrarily assigned.

<Namespace>DOM_<Description>

Example:
ZDOM_WERKS
Where –
Z = Namespace
WERKS = Description

1.8.3 Data Elements

The maximum length of a data element is 30 characters. The first character must be 'Z' for production and 'Y' for test data element. Followed by 'DE_' and the remaining characters can be arbitrarily assigned.

<Namespace>DE_<Description>

Example:
ZDE_WERKS
Where –
Z = Namespace
WERKS = Description

1.8.4 Lock Objects

Lock object names can be up to 16 characters long and should start with the prefix 'EZ_' for production and 'EY_' for test lock object. The remaining characters are open to the developer. However, the table name should be used whenever possible.

E<Namespace>_<Description>

Example:
EZ_EBAN
Where –
Z = Namespace
EBAN = Description (Table name)

1.8.5 Search Helps

Search Helps are ABAP dictionary objects and can be created at any point in the Repository Browser.

Search Helps are linked to data elements, check tables and structure fields. You can also define default values for input parameters using Search Helps. Search Help Exits are function modules that allow you to change the appearance and functionality of how the Search Help appears to the user, however it is recommended by SAP not to overuse Search Help Exits to preserve the integrity of regular Search Help process.

Several search helps can be combined to form a collective search help. The user can then choose between several search options in the input help.

Elementary Search help - <Namespace>SH_<Description>
Collective search help - <Namespace>CH_<Description>

Example:
Elementary Search help:
ZSH_WERKS
Where –
Z = Namespace
WERKS = Description

1.9 ABAP CLASSES OBJECTS

General Remarks
When you choose names for development objects, you should:
Use English names
Use glossary terms when possible
Example: ZCL_COMPANY_CODE instead of BUKRS

In compound names, use the underscore character (_) as a separator. Since names are not case-sensitive, this is the only character that you can use to separate names.
Example: ZCL_COMPANY_CODE, ZCL_GENERAL_LEDGER_ACCOUNT

Names should describe the action, not the implementation of the action.
Example: PRINT_RECTANGLE, not RECTANGLE_TO_SPOOL

1.9.1 Conventions for Object Types

Description	Format and examples
Class in the class library The class name should be made up of singular nouns.	ZCL_<Class Name> Example: ZCL_COMPANY_CODE, ZCL_GENERAL_LEDGER_ACCOUNT
Exception Class in the class library A special type of class that is derived from the superclass CX_ROOT.	ZCX_<Class Name> Example: ZCX_INVALID_NAME, ZCX_ACCESS_DENIED
Interfaces in the class library The same naming convention applies to interfaces as to classes.	ZIF_<Interface Name> Example: ZIF_STATUS_MANAGEMANT, ZIF_CHECKER
Local classes in programs (recommendation) The class name should be made up of singular nouns.	LCL_<Class Name> Example: LCL_TREE_MANAGEMENT
Local Exception Class in programs (recommendation) A special type of class that is derived from the superclass CX_ROOT.	LCX_<Class Name> Example: LCX_INVALID_NAME, LCX_ACCESS_DENIED
Local interfaces in programs (recommendation) The same naming convention applies to interfaces as to classes.	LIF_<Interface Name> Example: LIF_PRINTER

1.9.2 Conventions for Components

Description	Format and examples
Method name Method names should begin with a verb:	<Method Name> Example: GET_STATUS, CREATE_ORDER, DETERMINE_PRICE
Events Event names should have the form <noun>_<participle>:	<Event Name> Example: BUTTON_PUSHED, COMPANY_CODE_CHANGED, BUSINESS_PARTNER_PRINTED
Local type definitions within a class (recommendation)	TY_<Type Name> Example: TY_INTERNAL_TYPE, TY_TREE_LIST
Data definitions (variables) When you name variables within a class (CLASS-DATA or DATA), avoid using verbs at the beginning of the name (to avoid conflicts with method names).	<Variable Name> Example: LINE_COUNT, MARK_PRINTED, MARK_CHANGED, STATUS
Data definitions (constants) (recommendation)	C<Constant Name> (C*) Example: CO_MAX_LINE, CO_DEFAULT_STATUS, CO_DEFAULT_WIDTH, CO_MAX_ROWS

1.9.3 Concrete Method Descriptions

Description	Format and examples
Attribute access Methods that access attributes of any kind should be prefaced with GET_ or SET_.	SET_<Attribute Name> GET_<Attribute Name> Example: GET_STATUS, SET_USE_COUNT
Event handler methods Methods that handle events should begin with ON, followed by the name of the event that they handle.	ON_<Event Name> Example: ON_BUTTON_PUSHED, ON_BUSINESS_PARTNER_PRINTED
Methods that perform type conversions	AS_<New Type> Example: AS_STRING, AS_ISOCODE
Methods that return a Boolean value These methods may not return any exceptions. Recommendation: Use SPACE and 'X' to represent false and true respectively.	IS_<Adjective> Example: IS_OPEN, IS_EMPTY, IS_ACTIVE
Check methods	CHECK_<Objective> Example: CHECK_AUTHORIZATION, CHECK_PROCESS_DATE

1.9.4 Conventions for method parameters

Description	Format and examples
Importing parameters	I*
Exporting parameters	E*
Changing parameters	C*
Returing paramters	R*
Event parameters	E*

1.9.5 Conventions for subroutine form parameters

Description	Format and examples
Using parameters	P_*
Tables parameters	P_*
Changing parameters	C_*

1.1.1. Conventions for Function module parameters

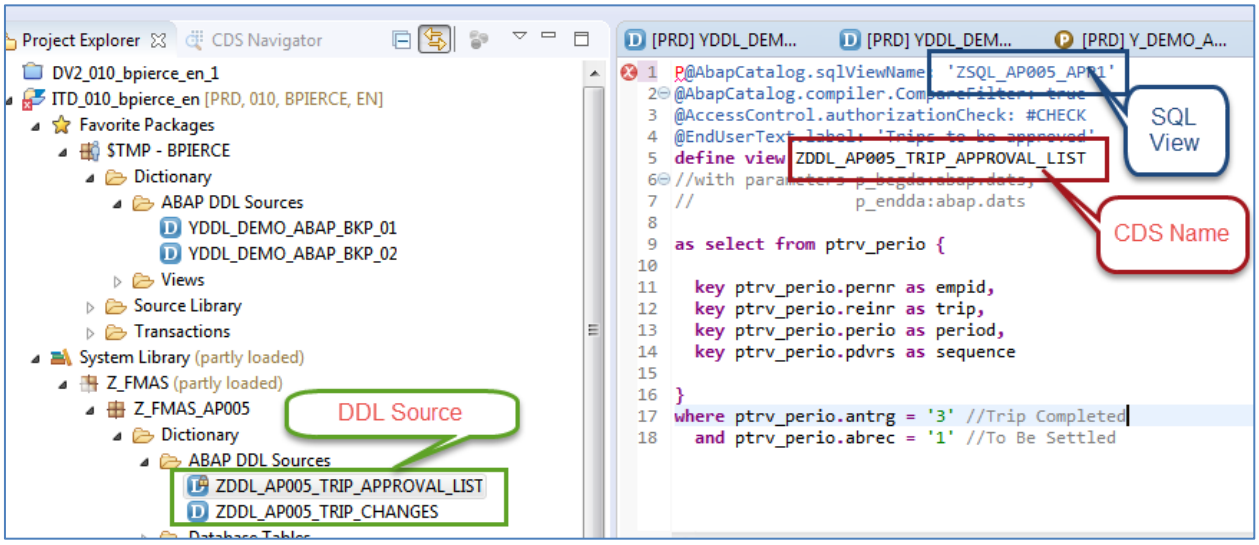
Description	Format and examples
Importing parameters	I*
Exporting parameters	E*
Changing parameters	C*
Tables paramters	T*

Note: Using table paramter in function module is obsolate and should be avoided. create table types and use them as import/export or changing parameters.

1.10 CDS – Core Data Services

There are 3 parts when you create a CDS.

DDL Source – This is the name we give when we create CDS view.
CDS View - This is the name of the CDS entity .
SQL View - This is the SQL view we would be using directly in the program.



Suggested naming convention for these objects are

DDL name - ZDDL_'desc' <- CDS View and DDL name should be same.
CDS View - ZDDL_'desc' <- CDS View and DDL name should be same.
SQL View - ZSQL_'desc'

1.11 FUNCTION OBJECTS

1.11.1 Function Groups

Function modules are grouped together using function groups. SAP supplied function groups should never be assigned to new function modules.

<Namespace><Module ID>_< Short Description>

Example: ZFI_ACCOUNTS_RECEIVABLE
Where:
Z = Namespace
FI = Module ID (FI for Contract accounts receivable and payable)
ACCOUNTS_RECEIVABLE = Short Description

1.11.2 Function Modules

The function module name can be up to 30 characters long and must begin with 'Z'.

<Namespace><Module ID>_<Short Description>

Example:
ZFI_CHECK_DATE
Where:
Z = Namespace
FI = Module ID (FI for Contract accounts receivable and payable)
CHECK_DATE = Short Description

1.13 SAP ENHANCEMENTS

SAP Enhancement projects (transaction CMOD) can be up to 8 characters long. Because of this limitation the underscores and Module ID should not be used. Enhancement project names should be in the format of:

Z<Description>

Example:
ZEquipmt

1.13.1 BADI implementations

BADI implementations can be up to 30 chacters long. BADI implementations should be in the format of
Z_(funcational area)_BI_(desc)
Example: ZISU_BI_CUST_CONTROL

1.13.2 Enhacement implementations

Enhancement implementations can be up to 30 chacters long. Enhancement implementations should be in the format of
Z_(funcational area)_EI_(desc)
Example: ZISU_EI_CUST_CONTROL

1.14 PRINT WORKBENCH AND LAYOUT SETS

1.14.1 Application Form

<Namespace>PWB_<Module ID><Tracking ID>

Example:
ZPWB_FI001
Where:

Z = Namespace
FI = Module ID (FI for Contract accounts receivable and payable)
001 = Tracking ID (Same Tracking ID used in Functional/Technical Spec)

1.14.2 Top Include and Exit include

<Namespace><Module ID>_PWBTOP_<Description>

<Namespace><Module ID>_PWBEXIT_<Description>

Example:
ZFI_PWBTOP_ISUBILL
ZFI_PWBEXIT_ISUBILL
Where –
Z = Namespace
FI = Module ID (FI for Contract accounts receivable and payable)
ISUBILL = Description

1.14.3 Generated function group/module

<Namespace><Module ID>_PWBFG_<Description>
<Namespace><Module ID>_PWBFM_<Description>

Example:
ZFI_PWBFG_ISUBILL
ZFI_PWBFM_ISUBILL
Where:
Z = Namespace
FI = Module ID (FI for Contract accounts receivable and payable)
ISUBILL = Description

1.14.4 User Exit on loop-levels (Before, During, After)

<Levelname>_<Description>

Remark: these names should NOT contain the words:
Before
During
After
Exit

Example:
DOC_ITEM_SORT_MR

1.14.5 Text Exit

<Textname>_<Description>
Remark: these names should NOT contain the word “Exit”

Example:
ADDRESS_CONDITION

1.14.6 Text

<Module ID>_<Description of the Application Form>_<Description>

The DESCRIPTION part of the Application Form should be part of the text name as text will be stored as text-modules (in transaction SO10). To avoid text being picked up by accident by other Application Forms, we should specify the description of the Application Form in the name of the text, unless we perform planned re-use of texts, belonging to another Application Form. An example of this can be a text containing the address specification of a customer. This text can and will be used by multiple Application Forms and/or Layout Sets (SAPscript).

Example:
BI_BILL_METERREADING
BI_CUSTADDRESS

Where:
BI = Billing
CUSTADDRESS = Description

1.14.7 Layout Sets

A layout set can be a maximum of 16 characters. It should start with 'Z' for production and 'Y' for test layout set. It is followed by the Module ID and Sub-Module ID. The remaining characters are used for description.

Z<Module ID>_SCR_<Description>

Example:
ZFI_SCR_BILL
Where:
Z = Namespace
FI = Module ID (FI for Contract accounts receivable and payable)
BILL = Description

1.15 SMARTFORMS

A Smartform can be up 30 characters. It should start with "Z" for production and "Y" for test Smartform. It is followed by the Module ID and Sub-Module ID. The remaining characters are used for description.

Z<Module ID>_SMF_<Tracking ID>_< Description>

Example:
ZSD_SMF_SD108_CASH_INVOICE
Where:
Z = Namespace
SD108 = Tracking ID
CASH_INVOICE = Description

Note: Smartforms are outdated. Any new forms must be created as Adobe forms.

1.16 ADOBE DESIGNER OUTPUT (ACCELIO) FORMS

An Accelio design for has the extension IFD (source) and MDF (compiled). It is MS Windows based so there is no limit in filename length. “Z” and “Y” prefix is not required (outside SAP).

<Module ID><Tracking ID>_< Description>

Example:
PM915_Crewbuilding.ifd

1.17 ADOBE FORMS

A Adobe form can be up 30 characters. It should start with “Z” for production and “Y” for test Adobeform. It is followed by the Module ID and Sub-Module ID. The remaining characters are used for description.
Adobe forms should have the following naming convention.

Z<Module ID>_ADF_<Tracking ID>_< Description>

Example:
ZSD_ADF_SD108_CASH_INVOICE
Where:
Z = Namespace
SD108 = Tracking ID
CASH_INVOICE = Description

Adobe form interface should have the following naming convention.
Z<Module ID>_ADI_<Tracking ID>_< Description>

Example:
ZSD_ADI_SD108_CASH_INVOICE
Where:
Z = Namespace
SD108 = Tracking ID
CASH_INVOICE = Description

1.18 OTHER OBJECTS

1.18.1 IDOC

IDOC Basic Type should be named as follows:

<Namespace><Module ID>_I_<Description>

Example:
ZFI_I_ISUBILLING
Where:
Z = Namespace
FI = Sub Module ID
ISUBILLING = Description

IDOC segment should be named as follows:

<Namespace><Description>

Example:
ZEQUIPMENT
Where:
Z = Namespace
EQUIPMENT = Description

IDOC Message Types should be named as follows:

<Namespace><Process Description>_<Process Type>

Example:
ZENROLLMENT_IN or ZENROLLMENT_OUT
Where:
Z = Namespace
ENROLLMENT = Process Description
IN/OUT = Process Type Inbound or Outbound

1.18.2 Message types

Message types start with 'Z' and can be up to 30 chars. The characters after 'Z' should briefly indicate the purpose of the message type.

1.18.3 Workflow Templates

Workflow templates should be named as follows (up to 40 chars):

<Namespace>W_<Module ID><Tracking ID><Short Description>

Internal ID will be generated by SAP.

Example:
ZW_FI001 Meter read upload
Where:
Z = Namespace
FI = Module ID
001 = Tracking ID (Same Tracking ID used in Functional/Technical Spec)

1.18.4 Workflow Tasks

Workflow task should be named as follows (up to 40 chars):

<Namespace>W_<Module ID><Tracking ID><Short Description>

Internal ID will be generated by SAP.

Example:
ZW_FI001 Check meter status
Where:
Z = Namespace
FI = Module ID
001 = Tracking ID (Same Tracking ID used in Functional/Technical Spec)

1.18.5 Business Objects

In creating business objects, there are two possibilities:

- If an object has been copied from a super type as a subtype, the name should include as much as the super type name as possible with a 'Z' in front.
  Example: If a parent object is 'INSTLN', child object is 'ZINSTLN'
- If an object is copied new with no reference to parent object, an appropriate description starting with 'Z' should be used.
  Example: ZGENERIC

1.18.6 Front Office Processes

Front Office should be named as follows:

<Namespace><Description>

Example:
ZINCREP
Where:
Z = Namespace
INCREP = Description

1.18.7 Background Jobs

All background jobs, ABAP programs setup to run in the background, are client-dependent objects. They are submitted when the system is active. Background jobs have an assigned starting point and various selection parameters. – Updated from Basis req 9/08

COT_<Job Frequency>_<Module>_<Description>

Job Frequency: H – Hourly M - Monthly E – Event
D - Daily Q - Quarterly O – Other
W - Weekly A – Adhoc
Module (Must be 2 characters):
SAP Module

Example:
COT_D_AP_PaymentRun
Where:
D = Daily Job
AP = SAP Module
PaymentRun = Description

1.18.8 Batch Input Sessions

Batch input session names can be up to 12 characters long. The first 8 or 9 characters will be the name of the primary program that created the session. The remaining 3 or 4 characters should match the last 3 or 4 digits of the dataset that it is accessing, creating, or modifying.

<Program Name>_<Sequential Number>

NOTE: Sequential number matching last 3 digits of dataset serial number (for interfaces) or OPEN (for non-interfaces)

Example:
ZR_FI001_001

Where:

ZR_FI001 = Program Name

001 = Sequential Number

1.18.9 Macros

The name can be up to 30 chars in length.

<Namespace>_<Description>

1.18.10 Field groups

Field groups are used to process datasets with varying structures. The data consists of a sequence of records of a pre-defined structure and can be accessed only within a loop. The name can be up to 30 chars in length.

<Namespace>_<Description>

1.18.11

1.18.12 Internet Services

Internet Service names are limited to 14 characters. SAP Internet Services are often available to external parties (e.g. ISS) and, therefore, should not have Module ID or TR tracking number as part of the service name:

Z<Internet Application ID>_<Description>

Example:
ZISS_Enroll

1.18.13 Email Subdomain Naming

Email subdomains should consist of the module id, tracking id, the username as part of the subdomain string, the sequence number (three digit) of the SU01 email address record, and then the standard domain component at the end.

Emails all use the same username dependent on the SAP system ID.

SYSTEM	SAP USERID / EXCHANGE ACCOUNT ID
PRD	ECC-PRD
QA2	ECC-QA2
DV2	ECC-DV2

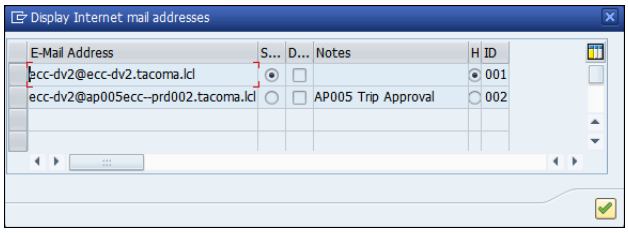
Overall Naming Standard Components
<username>@<subdomain>.tacoma.lcl

Detailed Naming Standard of <subdomain>
<username>@<
ModuleID><TrackingID><username><UserEmailSequenceNo>.tacoma.lcl

Production Example:
ecc-prd@ap005ecc-prd002.tacoma.lcl
Where:

ecc-prd = System Username
@ = Standard for all emails
ap = Module ID (AP is Accounts Payable)
005 = TrackingID (005 is Travel Expense)
ecc-prd= System Username
002 = Sequence identifier from SU01 email address record.
.tacoma.lcl = Standard domain for ALL accounts.

SU01 Email Address showing sequence identifiers (001 and 002) on right of table.



Additional Examples
ecc-prd@ap005ecc-prd001.tacoma.lcl
ecc-qa2@ap005ecc-qa2001.tacoma.lcl
ecc-dv2@ap005ecc-dv2001.tacoma.lcl

ecc-prd@ap005ecc-prd002.tacoma.lcl

ecc-qa2@ap005ecc-qa2002.tacoma.lcl
ecc-dv2@ap005ecc-dv2002.tacoma.lcl

ecc-prd@pt027ecc-prd001.tacoma.lcl
ecc-qa2@pt027ecc-qa2001.tacoma.lcl
ecc-dv2@pt027ecc-dv2001.tacoma.lcl

1.18.14 Logical File Paths

Transaction FILE allows for the configuration of custom logical file names and logical paths. The recommended naming standard is as follows:

Choose Option 1 or 2 depending on your specific need. Option 1 has been the undocumented standard and many existing developments are built this way. Option 2 is the preferred format moving forward but either are valid.

Option 1: (Legacy Objects)
Z <Business Process ID>

Example:
ZFE080

Where:
Business Process ID = FE080

Option 2:
Z <Business Process ID>_ < IN / OUT / ERR >

Example:
ZPA008_OUT

Where:
Business Process ID = PA008

1.18.15 Logical File Names

Transaction FILE allows for the configuration of custom logical file names and logical paths. The recommended naming standard is as follows:

Z <Module ID> <Development ID>_<Num seq. for multiple file ref>

Example:
ZFE080_1

Where:
Module ID = FE
Development ID = 080
Num seq. for multiple file ref = _1

Additional Configuration Reference Example:
Logical File: ZFE080_1
Name = FERC Data Download - FERC_D1
Physical file = FE080_1_FERC_D1
App Area = FI
Logical File Path = ZFE080

1.19 eCATT Objects

1.19.1 eCATT Naming Standards

There are four eCATT containers: Test Script, Test Data, Test Configuration, and System Data.
All eCATT containers should adhere to the following naming convention:
<Namespace><eCATT container abbreviation>_<Short Description>

The Container abbreviations are:

Abbreviation	Description
TS	Test Script
TD	Test Data
TC	Test Configuration
SD	System Data

- Test Script example
  A test script may include command(s) testing a self-contained program like function module, ABAP Class, ABAP background/dialog program. Therefore, a test script name should describe such activity.
  Example: ZTS_FIND_ADDRESS

- Test Data example
  A test data container stores address data for premises.
  ZTD_PREMISE_ADDRESS

- Test Configuration example
  A test configuration container references a test script container Z_FIND_ADDRESS and a test data container Z_PREMISE_ADDRESS.
  ZTC_FIND_ADDRESS

- System Data example
  A data container ZSD_SYSTEMS is preferred system data container to use. A new system data container can be created per request.
  ZSD_FIND_ADDRESS

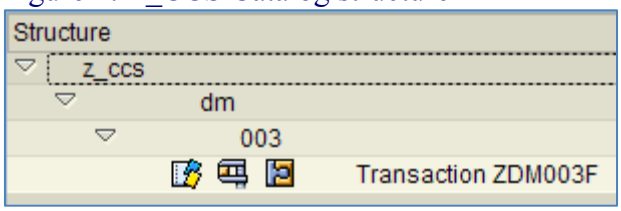
1.19.2 Test Catalog structure

- z_<Application Function>
  - <Module Id>
    - <Tracking Id>

Example:

- z_ccs
  - dm
    - 003

Figure 1: Z_CCS Catalog structure



1.20 WEBDYNPRO OBJECTS

1.20.1 Conventions for Webdynpro objects

Description	Format and examples
Web dynpro components	ZWD_(functional areaXXX)_C_(desc) Ex: ZWD_PM017_C_WTR_FEEMAINT
Web dynpro applications	ZWD_(functional areaXXX)_A_(desc) Ex: ZWD_PM017_A_WTR_FEEMAINT
Webdynpro Component Configuration	ZWD_(functional areaXXX)_CC_(desc) Ex: ZWD_PM017_CC_WTR_FEEMAINT
Webdynpro Application Configuration	ZWD_(functional areaXXX)_AC_(desc) Ex: ZWD_PM017_AC_WTR_FEEMAINT

City of Tacoma

SAP NetWeaver Process Integration (PI) Development Standards

DRAFT

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1. Revision History

Version	Revision Date	Changed By	Revision Notes
0.1	10/27/2015	Ivan Kalcha	Draft

2. Objective

Development standards to be followed for design and implementation of enterprise services that run on SAP NetWeaver Process Integration (PI) software

3. Roles, Responsibilities and Skill Sets

3.1.Roles Definitions

• Basis / Infrastructure ○ PI Basis Architect ○ PI System Administrator ○ SLD Administrator	• Application / Development ○ PI Solution Architect ○ PI Developer
• Monitoring and Troubleshooting ○ PI Application Monitor ○ PI Basis Monitor	• Governance ○ PI ESR Administrator ○ PI Standards Analyst

3.2.Responsibilities

3.2.1. Basis / Infrastructure

PI Basis Architect

- Define architecture in the area of PI Infrastructure Management, for example
  - Deployment options for PI components (ESR, SR)
  - Security
  - Scalability
  - Business Continuity (High Availability)
- Software Logistics Architecture
  - Release and Upgrade Management
  - Change and Transport Management
- Architectural responsibility for the SLD, for example

- Deployment options
- Transport strategy for SLD Content

PI System Administrator

- Implement and configure the architecture defined by the PI Basis Architect
- Perform System Configuration of SAP PI (installation, configuration of Web AS, …)
- System Management (User Management, Exchange Profile Maintenance,…)
- Security Operations (e. g. handling of certificates)

SLD Administrator

- Implement the SLD architecture defined by the PI Basis Architect
- Conduct all activities that affect the administration and configuration of the SLD
  - Administration: User Management, Transport of content (if required), etc.
  - Configuration: maintenance of Business Systems, Products, Software Component Versions, etc.

3.2.2. Application / Development

PI Solution Architect

- Main point of contact into the PI team in questions of integration from outside
- Overall PI solution architecture and strategy (Guidelines, Integration patterns etc)
- Governance and quality assurance
- Compliance with IT processes

PI Developer

- Creation of PI technical designs for integration scenario requirements
- Development in Enterprise Services Repository
- Configuration in Integration Builder
- Technical Documentation
- Configuration in Integration Builder

3.2.3. Monitoring and Troubleshooting

PI Application Monitor

- Monitor message processing and message throughput
- Troubleshooting and status tracking of messages
- Error and alert handling
- Root-cause analysis

PI Basis Monitor

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- Monitor all technical PI instances, services and applications
- Troubleshoot basis errors
- Root-cause analysis in basis area

3.2.4. Governance

PI ESR Administrator

- Capture and maintain metadata
- If SOA approach: maintain GDT catalog / business object maps / modelling
- If Generic Business Object (GBO)/canonical data model is used: Maintenance and assure proper use of metadata

PI Standards Analyst

- Monitor and promote integration content (e. g. industry standards) into or out of the enterprise
- Act as your company's official representative in the various communities

4. The System Landscape Directory (SLD)

4.1.Maintaining Products and Software Components in the SLD

Products and Software Components are created by Basis resource upon written request from PI Developer. PI Developer is to provide the exact name of an SLD object to be created and other applicable information.

Example of request details for Product

Field Name	Entry
Vendor	**cityoftacoma.org**
Name	**cityoftacoma_equifax**
Version	**1.0**

4.2.Maintaining Technical Systems and Business Systems in the SLD

Technical Systems and Business Systems are created by Basis resource upon written request from PI Developer. PI Developer is to provide the exact name of an SLD object to be created and other applicable information.

Example of request details for Business System

Field Name	Entry
Type o Technical System	**AS ABAP**
Business System Name	**BS_ECC_DV2**
Select the Technical system for the business system	**TS_ECC_DV2**

5. Interface Objects in the Enterprise Services Repository (ESR)

PI Developer is responsible for developing and maintaining ESR (design) components for an interface.

Example of ESR components:

- Data Type
- Message Type
- Service Interface
- External Definition of Interfaces
- Imported Objects
- Message Mapping
- Message Operation

6. Configure Integration Directory (Configuration) Objects

PI Developer is responsible for developing and maintaining PI configuration components for an interface.

In Production environment of PI system, Basis resource is responsible for configuration of direct connections (communication channels). PI Developer is responsible to provide documentation for such changes. An example can be a screenshot that shows fields clearly marked for changes and what are new values.

Example of request for data to be updated

Field Name	Entry
Target URL	**<new URL link>**
User name	**<new user name>**
User password	**<new password>**

7. Connectivity options in SAP NetWeaver PI

SAP NetWeaver PI provides various technical connectivity options for connecting applications that are based on various technical or application specific protocols.

7.1.Examples of adapters:

- File/File Transfer Protocol FTP(S) adapter
  This adapter enables data exchange with external systems using file interface or an FTP server
- JAVA Database Connectivity (JDBC) adapter
  This adapter enables access to databases using JDBC.
- SOAP adapter
  This adapter enables integration of remote clients or Web service providers using SOAP.
- HTTP adapter
  This adapter enables the exchange of data using the HTTP protocol.
- Mail adapter
  This adapter enables you to connect to e-mail servers to Integration Engine.
- Remote Function Call (RFC) adapter
  This adapter enables communication with SAP ECC systems using the RFC interface.
- IDoc adapter
  This adapter enables the exchange of iDocs.
- REST adapter
  TODO
- Business Connector (BC) adapter
  TODO
- Marketplace adapter
  TODO
- CIDX adapter
  TODO
- JMS adapter
  TODO
- WS_AAE adapter
  TODO
- RNIF adapter
  TODO
- RNIF11 adapter
  TODO

7.2.Proxy Technology

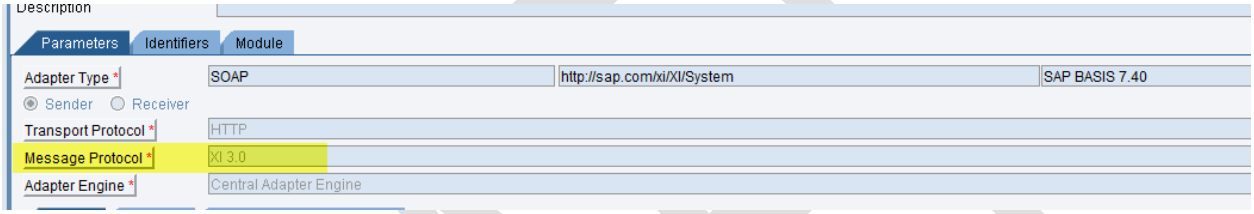
Proxy connectivity should be always considered as primary connectivity option when designing PI services that interface with SAP ECC system. (SAP Systems have a local Integration Engine and may directly use the SAP NetWeaver PI protocol to exchange messages with the central Integration Engine of SAP NetWeaver PI.)

DRAFT

7.3.Application Connectivity for communication with SAP ECC

- Proxy adapter

  This connectivity option must be considered as first choice for all outbound/inbound communication to SAP ECC system.



- IDoc adapter

  Use of IDoc adapter may be driven by SAP ECC business function that supports such connectivity option.

- RFC adapter

  The RFC adapter can be another connectivity option between PI and SAP ECC. Before considering using RFC adapter, PI Developer should research whether proxy connectivity option can be used.

8. Change Requests

All changes in SAP NetWeaver PI system must follow the SAP NetWeaver PI Change and Transport System (CTS+) process.
Any production bound service must originate and be developed in DXI system of SAP NetWeaver PI.

8.1.PI Transports

PI Developer is to create PI Change Request. It is better to organize ESR/ID components per individual PI service into a single PI Change Request for final transport to Production.

PI Developer is to release PI transport and send a request to Basis resource to complete the import of the PI transport into target system of PI (QXI).

8.2.ABAP Workbench Transports

ABAP/PI Developer is to create ABAP Workbench Change Request. It is better to transport ABAP Change Requests after PI Transports.

9. Security

TODO

10. Use of SAP Enterprise Services (ES) Workplace

The SAP ES Workplace is the central place to view information about all available Enterprise Services delivered by SAP. Always use SAP delivered PI services where possible. Always check ES Workplace for new services that can be a good fit for your scenario; however, installment of new PI services must be approved by PI Solution Architect.

11. References

- SAP Roles, Responsibilities and Skill Sets in a PI Environment
  http://scn.sap.com/docs/DOC-3508
- SAP NetWeaver PI – Development
  2nd edition, Galileo Press, www.sap-press.com

DRAFT

City of Tacoma

SAP NetWeaver Process Integration (PI) Development Naming Standards

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2 REVISION HISTORY

Version	Revision Date	Changed By	Revision Notes
0.1	10/27/2015	Ivan Kalcha	Draft
0.2	08/03/2016	Ivan Kalcha	Added PI Change Request
2.0	12/19/2017	Bryan Pierce	Removed Draft Watermark. Added Job Scheduling section and Technical Specification section.

1. OBJECTIVE

Using consistent development standards and naming conventions through Enterprise Services development will contribute significant time and resource savings. Standards will benefit initial construction, long term maintenance, and upgrade of the SAP system and improve system efficiency dramatically.

The objective of this manual is to define guidelines for the SAP PI developers. The standards defined in this document should be adhered to in designing Enterprise Services in the SAP NetWeaver Process Integration (SAP PI) environment.

3 NOTATION

3.1 GENERAL RECOMMENDATION

- Use Upper Camel Case: Words of a name are joined without spaces, and are capitalized within the compound
- For better readability, use shorter names, abbreviations, or codes, see also general abbreviation rules below

3.2 GENERAL ABBREVIATION RULES

- Always guarantee that resulting abbreviations remain understandable and distinguishable

- Try not to create abbreviations that are themselves English words
- An abbreviation should be associated with only one unabbreviated word
- Do not use abbreviations that will conflict with commonly known abbreviations
- Your abbreviation should begin with the same letter as the word being abbreviated
- Words that are four or less characters in length should not be abbreviated
- Distinguish between
    - Abbreviations for Individual terms (e.g., Arrgmt - Arrangement)
    - Acronyms (e.g., RFQ - Request for Quote)

4 TECHNICAL SPECIFICATION

4.1 FILE LOCATION

All technical specifications for PI developments reside in a single folder at the following location:

- \\fs005\bisd\SAP\SAPTechnical\TechnicalSpecifications\UTILITY\SAP-PI

Syntax	
Transport Request description	<Application Function>:<Development Id or Module Id> <Project Number> <Short Description> #<Sequence Number>
Glossary	
<Application Function>>	WMS
Development Id or Module Id>	PM530
<Project Number>	98002232323
<Short Description>	Added new input fields
<Sequence Number>	1

5 JOB SCHEDULING

5.1 JOB SCHEDULE (AVAILABILITY PLANNING)

Jobs scheduled in PI are found under the Availability Planning name functionality. Use of the 'Availability Planning' term is the same as terminology as 'Jobs' or 'Batch Job' and can be used interchangeably. Documentation for these automated schedules will try to use the Availability Planning nomenclature as much as possible to distinguish between ECC batch job scheduling.

When building out Availability Planning schedules the following naming standard should be followed.

Syntax - Availability Planning Description	
Job Availability Planning Description	<Business_Process_ID>_<Common_Name>_<Purpose>_<Direction>
Glossary	
<Business_Process_ID>	Standard Business Process ID Format XX### assigned by the Business Analyst.

<Common_Name>	Agreed short nickname for interface. Typically determined by Business Analyst.
<Purpose>	Upload | Download | Delete
<Direction>	In | Out

EXAMPLES

PY003_TACBEN_Upload_Out

PY003_TACBEN_Delete_Out

5.2 JOB SCHEDULE (AVAILABILITY PLANNING) DOCUMENT LOCATION

All job schedule documents are stored in a sub folder of the Technical Specification directory:

- \\fs005\bisd\SAP\SAPTechnical\TechnicalSpecifications\UTILITY\SAP-PI\PI_BatchJobRepository

Syntax	
Job Availability Planning Document	<Interface_Type>_<Availability_Planning_Description>
Glossary	
<Interface_Type>	FTP (currently only FTP)
<Availability_Planning_Description>	See Job Schedule (Availability Planning) section.

EXAMPLES

FTP_PY003_TACBEN_Upload_Out

FTP_PY003_TACBEN_Delete_Out

6 SYSTEM LANDSCAPE DIRECTORY

6.1 PRODUCT

A product is a unit that is delivered, visible to the customer, and is installable and renewable. A product can have several versions. Each product consists of various versions of software components.

We divide the products into five different groups (see figure below):

- **Interface Products:** Represent extensions to current applications. These extensions are imported later to the Integration Repository and connect the corresponding interface objects and integration scenario actions.

- **Exchange Infrastructure (XI) Application Products:** Represent objects in the Integration Repository other than interface objects (for example, mapping objects and integration processes).

- **Non-Interface Application Products:** Represent all other applications, including WebDynpro customer developments, SAP software, and so on.

- **Basis Products:** Ideal for templates, generic structures, shareable Java programs, and so on.

- **Canonical Definitions:** For generic business objects; intended for reuse.

Group of Products	Prefix
Interface Products	I
XI Application Products	A
Basis Products	B
Canonical Definitions	C

Syntax	
Product Name	<Company>(<Group>)?_<Business Application>
Version	<Generic Version Number starting with 1.0>
Vendor	<Your Company Domain Name>
Glossary	
<Company>	Specify a string naming your company
<Group>	I | A | C | B
<Business Application>	Specify your actual business application or technical component, e.g., Sales, Financial, CRM, etc
<Generic Version Number>	1.0→1.1→2.0 etc.
<Company Domain Name>	This could be www.mycompany.com

EXAMPLE

CityOfTacoma_I_ECC, Version 1.0 of CityOfTacoma.org

TacomaPublicUtilities_ I_Gateway, Version 1.0 of MyTPU.org

ESRI_ I_ArcCISForWater, Version 1.0 of Esri.org

InnovativeSolutions_ I_IVR, Version 1.0 of InnovativeSolutions.org

Equifax_I_MutliVision, Version 1.0 of Equifax.com

6.2 SOFTWARE COMPONENT VERSION

Software components represent the reusable modules of a product.

Syntax	
SWCV Name	SC_<Company>_<Product>(_<Group>)?_<Application>
Vendor	<Your Company Domain Name>

Version	<Generic Version Number starting with 1.0>
Glossary	
<Company>	Specify a string naming your company
<Group>	I | A | C | B
<Product>	Specify the product the software component belongs to
<Application>	Specify your actual application on a functional area level, e.g. Global Spend Analysis in SRM, Supply Network Planning in Manufacturing, etc .
<Generic Version Number>	1.0 → 1.1 → 2.0 etc
<Company Domain Name>	This could be www.mycompany.com

Functional Areas for SAP ECC System

Functional Area	Description
CCS	ISU CCS
HRMS	Human Resources
WMS	Work Management
FMAS	Financial Management System

EXAMPLE:

SC_CityOfTacoma_ECC_I_CCS, Version 1.0 of CityOfTacoma.org

SC_CityOfTacoma_ECC_I_WMS, Version 1.0 of CityOfTacoma.org

SC_TacomaPublicUtilities_Gateway_I_API, Version 1.0 of MyTPU.org
SC_ESRI_ArcCISForWater_I_API Version 1.0 of Esri.com
SC_InnovativeSolutions_IVR_I_API, Version 1.0 of InnovationSolutions.com
SC_Equifax_MutliVision_I_API, Version 1.0 of Equifax.com

6.3 TECHNICAL SYSTEM

Syntax	
Technical System	~~<Location | Organizational Area>?~~<Business Application>_<Stage>
Glossary	
~~<Location>~~	~~Specify the geographical area the system is located in~~
~~<Organizational Area>~~	~~Specify the business unit the system is assigned to~~
<Business Application>	Specify your actual business application or usage of the system
<Stage>	D | Q | P | T | <Other> (for Development, Quality Assurance, Production, Training, etc)

EXAMPLE:

TS_SAPECC_D

ProcurementSystem_Q

HumanResources_P

MDMServer_P

6.4 BUSINESS SYSTEM

Syntax	
SAP System	BS_<System ID>_<Client>_<Stage>
Other System	BS_<Location | Organizational Area>?<Business Application>_<Stage>
Glossary	
System>	Specify the three digit number of your SAP system
<Client>	Specify the client number of your SAP system
<Stage>	D | Q | P | T | <Other>
<Location>	Specify the geographical area the system is located in
<Organizational Area>	Specify the business unit the system is assigned to

<Business Application>	Specify your actual business application or usage of the system

EXAMPLE:

BS_DV2_010_D

BS_EsriGIS_D

6.5 BUSINESS SYSTEM GROUP

TODO

7 ENTERPRISE SERVICE REPOSITORY OBJECTS

7.1 FOLDER

TODO

7.2 NAMESPACE

Repository namespaces are used to avoid naming conflicts within object types in the ES Repository

Syntax	
Based on processes:	
Namespace	urn:<Company URN>:<Process Level>:(<Further Levels>:)*<Application>
Based on organization unit:	
Namespace	urn:<Company URN>:<Application>:<Org Unit Level>(:<Further Levels>)*
Glossary	
<Company URN>	This could be www.mycompany.com
<Process Level>	Specify your process level hierarchy, i.e., process and sub processes, e.g., CRM – Sales – Pricing & Contracts
<Application>	Specify your actual business application
<Org Unit Level>	Specify your organization and business unit hierarchy

EXAMPLE

urn:CityOfTacoma.org:ECC:CCS:CustomerAccount

urn:CityOfTacoma.org:ECC:WMS:Meter

urn:MyTPU.org:Gateway:API:Meter

urn:Esri.com:ArcCISForWater:API:Equipment

urn:InovativeSolutions.com:IVR:API:CustomerAccount

urn:CityOfTacoma.org:ECC:WMS:Permit

urn:Equifax.com:MutliVision:API:Customer

urn:MyCompany.com:ERP:Finance:Accounting

urn:MyCompany.com:Procurement:Europe:France

urn:MyCompany.com:US:ERP:MM:MaterialMaster

urn:MyPartner.com:MDM:Vendor:ValueMapping

7.3 PROCESS INTEGRATION SCENARIO & ACTION

TODO

7.4 MODEL

TODO

7.5 INTEGRATION PROCESS RELATED OBJECT

TODO

7.6 ALERT CATEGORY

TODO

7.7 DATA TYPE

A data types describe the data structure of messages.

Syntax	
Data Type Name	DT_<Business Object>
Glossary	
<Business Object>	Specify the underlying business object representing business content

EXAMPLE

DT_BusinessPartner

DT_Address

7.8 DATA TYPE ENHANCEMENT

TODO

7.9 MESSAGE TYPE

A message type contains a data type that describes the structure of a message.

Syntax	
Message Type Name	MT_<Business Object><Action>?<Message Type Category>
Glossary	
<Business Object>	Specify the underlying business object representing business content
<Action>	Create | Change | Update | Cancel | Maintain | Modify | Delete | Read | <Other>
<Category>	Notification | Request | Confirmation | Query | Response | <Other>

EXAMPLE

MT_PurchaseOrderCancellationRequest

MT_PurchaseOrderChangeRequest

MT_PurchaseOrderMigrateRequest

MT_SalesOrderConfirmation

MT_QuotationResponse

7.10 FAULT MESSAGE TYPE

Fault message types are used to catch application-specific errors.

Syntax	
Fault Message Type	FMT_<Business Object><Error Type>?
Glossary	
<Business Object>	Specify the underlying business object representing business content
<Error Type>	Specify an error category, e.g., authorization error, authentication error, error during update, etc

EXAMPLE

FMT_PurchaseOrderAuthorizationError

FMT_BankAccountStatementQueryError

7.11 SERVICE INTERFACES

A service interface consists of following: a name, description, category, interface pattern, messages for request/response/fault roles.

Syntax	
For Interface Pattern stateless:	
Service Interface	SI_<Business Object><Interaction Activity>_<Direction>
Note: For Interface Pattern stateless XI 3.0 compatible, please refer to Service Operation	
Glossary	
<Business Object>	Specify the underlying business object representing business content
<Interaction Activity>	Specify a more generic interaction activity
<Direction>	Inb | Out | Abs

EXAMPLE

SI_PurchaseOrderProcessing_Out
SI_BankAccountStatementProcessing_In
SI_SupplierQuery_Abs

SI_SalesOrderConfirmation_In

SI_CustomerAccountInfoInquiry_In
SI_CustomerAccountPostPaymentRequest_In
SI_MeterDisconnectRequest_In
SI_MeterCreateRequest_In
SI_EquipmentCreateRequest_In
SI_PermitInfoInquiry_In
SI_PermitQuery_In
SI_PermitByDateQuery_In
SI_CustomerCreditScoreCheckInquiry_In

7.12 SERVICE OPERATION

Syntax	
For Interface Pattern stateless:	
Operation Name	<Business Object><Action><Transaction Activity>?_<Mode>

For Interface Pattern stateless XI 3.0 compatible:	
Operation Name	<Business Object><Action><Transaction Activity>?_<Mode>_<Direction>
Glossary	
<Business Object>	Specify the underlying business object representing business content
<Action>	Create | Change | Update | Cancel | Maintain | Modify | Delete | Read | <Other>
<Transaction Activity>	Request | Query | Notification | Confirmation | Response | <other>
<Mode>	Sync | Async
<Direction>	In | Out | Abs

EXAMPLE

SalesOrderCreateRequest_Async

BusinessPartnerRead_Sync

QuotationCreateResponse_Async

EXAMPLE

SalesOrderCreateRequest_Async_Out

BusinessPartnerRead_Sync_In

SalesOrderCreateConfirmation_Async_Abs

7.13 EXTERNAL DEFINITION

An external definition enables you to import a local WSDL, XSD, or DTD file to the ES Repository.

Syntax	
External Definition	ED_<Business Object | Message Type>

Glossary	
<Business Object>	Specify the underlying business object representing business content
<Message Type>	Use the message type as specified in the XSD for instance

EXAMPLE

ED_LoanContract
ED_Quote

ED_PORequest

7.14 CONTEXT OBJECTS

TODO

7.15 MESSAGE MAPPING

Message mapping specifies how to transform a message from one data type into another.

Syntax	
Message Mapping	MM_<Source Message Type>(_and_<Further Source Message Type>)*_to_<Target Message Type>(_and_<Further Target Message Type>)*(_multi)?
Glossary	
<Message Type>	Specify the message type name

EXAMPLE

MM_MaterialMasterCreateRequest_to_MATMAS_MATMAS03
MM_PurchaseOrderRequest_and_InvoiceResponse_to_InvoiceConfirmation

MM_InvoiceNotification_to_InvoiceNotification_multi

7.16 MAPPING TEMPLATE

TODO

7.17 MULTIPLE MAPPING

TODO

MMM_<Source_to_Target_1_And_Target_2>

7.18 OPERATION MAPPING

Operation mappings register your mapping program for a pair of operations in the ESR.

Syntax	
Operation Mapping	OM_<Source Service Interface>?<Source Service Operation>(_and_<Further Source Service Interface>?<Further Source Service Operation>)*_to_<Target Service Interface>?<Target Service Operation>(_and_<Further Target Service Interface>?<Further Target Service Operation>)*(_multi)?
Glossary	
<Service Interface>	Specify the service interface name omitting direction
<Service Operation>	Specify the service operation name omitting mode

EXAMPLE

OM_SI_PurchaseOrderCreateRequest_to_SI_SalesOrderCreateRequest

OM_SI_MaterialMasterCreateRequest_to_SI_MATMAS_MATMAS03

OM_SI_QuotationResponse_to_SI_QuotationResponses_multi

7.19 IMPORTED ARCHIVE

In order to reuse existing mapping programs, you can import XSLT and Java mappings as archives in the ESR.

Syntax	
For archives containing one single mapping only:	
Archive Name	<Source Message Type>_to_<Target Message Type>_<Technology>
For archives containing several mappings:	
Archive Name	<Application | Mapping Category>(_<Technology>)?
Glossary	
<Message Type>	Specify the message type of the source and target message
<Technology>	XSLT | Java
<Application>	Specify an application the archives are related to
<Mapping Category>	Use a group name to categorize your archives

EXAMPLE

MT_SalesOrderItemRequest_to_MT_SalesOrderRequest_XSLT

MT_ContractManagement_Java

MT_PurchaseOrderProcessing_XSLT

7.20 FUNCTION LIBRARY

TODO

7.21 CONFIGURABLE PARAMETER

TODO

7.22 COMMUNICATION CHANNEL TEMPLATE

TODO

7.23 ADAPTER METADATA

TODO

7.24 USER DEFINED FUNCTION

You have option of creating your own user-defined functions for a target-field mapping to fulfill your requirements.

GENERAL RULES

- Use missed case with the first letter lower case, with the first letter of each internal word capitalized
- Document any changes to UDF with comments and the date
- Short note for any loop control, Decision Making etc.

Syntax	
Method Name	<Action><Business Object>
Name of Method Parameter	<Business Object>?<Any meaningful name >
Glossary	
<Business Object>	Specify the underlying business object representing business content
<Action>	Create | Change | Update | Cancel | Maintain | Modify | Delete | Read | <Other>

EXAMPLE

Name of Method

processPurchaseOrder

submitPayment

createOrderConfirmation

EXAMPLE

Name of Method Parameter

paymentDate

amount

8 INTEGRATION DIRECTORY OBJECTS

8.1 CONFIGURATION SCENARIO

TODO

8.2 FOLDER

TODO

8.3 PARTY

TODO

8.4 BUSINESS COMPONENT

BC_<Meaningful Name>

Syntax	
Glossary	

8.5 COMMUNICATION CHANNEL

8.5.1 GENERAL RULES

- A sender Communication Channel object ought to be placed in the same Communication Component as receiver Communication Channel object.
  - Example 1: Communication channels *CC_Soap_CustomerAccountQuery_Sender* & *CC_Soap_CustomerAccountResponse_Receiver* and business system *BS_ECC_DV2*.
  - Example 2: *CC_Soap_CustomerAccountQuery_Sender* & *CC_Soap_CustomerAccountResponse_Receiver* and business component *BC_Equifax*.

Syntax	
Channel Name	CC_<Adapter Type>_<Object | Description>? _<Direction>
Glossary	
<Adapter Type>	IDoc | RFC | File | JDBC | JMS | Proxy | SOAP | Http | Mail | RNIF | <Other>
<Direction>	Sender | Receiver Where Sender is for Client and Receiver is for Server
<Object>	Specify an underlying business object or message type
<Description>	Describe the usage of the channel

EXAMPLE

CC_IDoc_SalesOrderCreation_Receiver

CC_File_ProductQuery_Sender

CC_SOAP_Quotation_Receiver

CC_Mail_Quotation_Receiver

8.6 VALUE MAPPING

TODO

8.7 ICO/CONFIG SCENARIO

CS_<Meaningful Name>

8.8 VALUE MAPPING

VM_<Source Field Name>_<Group Name>

8.9 USER DEFINED MESSAGE SEARCH

Indexed interface name with out prefix and Suffix

Like remove SI and suffix(IB_Asyn) from interface name

ATP: Indexed interface name with out prefix and Suffix

8.10 TPZ FILE NAME

Syntax	
File Name	<PI component>_<Object Name>_<CR Number>(/<Defect Number>)?
Glossary	
<PI component>	ESR or ID
<Object Name>	
<CR Number>	PI Change Request Number

<Defect Number>	HPQC defect number

EXAMPLE

ESR_<Object Name>_<CR Number/Defect Number/Release Number>_<UC Number>.tpz

ID_<Object Name>_<CR Number/Defect Number/Release Number>_<UC Number>.tpz

9 PI CHANGE REQUEST

9.1 TRANSPORT REQUEST DESCRIPTION

Syntax	
Transport Request description	<Application Function>:<Development Id or Module Id> <Project Number> <Short Description> #<Sequence Number>
Glossary	
<Application Function>>	WMS
Development Id or Module Id>	PM530
<Project Number>	98002232323
<Short Description>	Added new input fields
<Sequence Number>	1

EXAMPLE

WMS:PM530 98002232323 Added new input fields #1

9.2 TRANSPORT REQUEST TASK DESCRIPTION

Syntax

Transport Request Task name description	<Project Number> <Short Description>
Glossary	
<Project Number>	98002232323
<Short Description>	New fields to outbound message

EXAMPLE

98002232323 New fields to outbound message

10 REFERENCES

- SAP Exchange Infrastructure 3.0: Best Practices for Naming Conventions https://www.sdn.sap.com/irj/scn/go/portal/prtroot/docs/library/uuid/90b213c2-d311-2a10-89bf-956dbb63aa7f
- SAP Exchange Infrastructure 3.0: Best Practices for Naming Conventions http://www.sdn.sap.com/irj/scn/go/portal/prtroot/docs/library/uuid/90b213c2-d311-2a10-89bf-956dbb63aa7f?QuickLink=index&overridelayout=true&15448997412054

EASD FUNCTIONAL REQUIREMENTS (FR)

*Business Process ID# and Title	
Business Sub-Process ID# and Title	

*PART A: CONTENT VERSION

Date	Created/ Changed By	iSTAR Project ID Number	Description of Change	Section(s)
			Initial Version	N/A

*PART B: STATEMENT OF REQUIREMENT

Brief description of the functionality needed to meet the requirements

Provide a summary statement about what is the functionality that is expected of the system in order to satisfy the business process in terms of the end results. (deliverable)

PART C: REQUIREMENTS GATHERING

***C.1 Requirement Details**

Elaborate and provide details of the requirements. Include any assumptions, dependencies, constraints and business rules that apply.

C.2 Role Create/Change Information

List all security/authorization checks that should be included for this functionality.

C.3 Master Data

List or describe master data requirements.

C.4 Prototyping/Mock-Ups

Provide a visual illustration of the end product.Table updates and drop downs can be covered by providing screen prints.

***C.5 Test Use Cases/Scenarios**

(A narrative of the business requirement that is verified through testing.) Indicate the business level test conditions that should be used to verify successful operation of this functionality.

EASD FUNCTIONAL REQUIREMENTS (FR)

*Business Process ID# and Title	
Business Sub-Process ID# and Title	

C.6 Training/Communication *Address any training needs or communication to end users.*
C.7 Additional Comments (optional)

PART D: RELATED DOCUMENTS

Date	Document Reference *List all documents that apply to the iSTAR Project. Includes any of the following: Blueprint, uPerform, role change form.*

PART E: REVIEW *(As needed at the discretion of the functional analyst)*

Completed By		Date	
End User Acceptance		Date	
Comments			

PART F: CONFIGURATION (FOR IT USE ONLY)

*F.1 Configuration Information *Was configuration performed as part of this requirement?*	Yes	☐	No	☐
F.2 IMG Path (optional) *Enter date and screen shot or written path of IMG nodes changed.*				

Date	IMG Path

EASD FUNCTIONAL/TECHNICAL DOCUMENT (FTD)

*Business Process ID# and Title	
Business Sub-Process ID# and Title	

*PART A: CONTENT VERSION

Date	Created/ Changed By	iSTAR Project ID Number	Description of Change	Section(s)
			Initial Version	**N/A**

*PART B: STATEMENT OF REQUIREMENT

Brief description of the functionality needed to meet the requirements

Provide a summary statement about what is the functionality that is expected of the system in order to satisfy the business process in terms of the end results. (deliverable)

PART C: REQUIREMENTS GATHERING

*C.1 Requirement Details

Elaborate and provide details of the requirements. Include any assumptions, dependencies, constraints and business rules that apply.

C.2 Role Create/Change Information

List all security/authorization checks that should be included for this functionality.

C.3 Master Data

List or describe master data requirements.

C.4 Prototyping/Mock-Ups

Provide a visual illustration of the end product. Table updates and drop downs can be covered by providing screen prints.

*C.5 Test Use Cases/Scenarios

(A narrative of the business requirement that is verified through testing.) Indicate the business level test conditions that should be used to verify successful operation of this functionality.

EASD FUNCTIONAL/TECHNICAL DOCUMENT (FTD)	
*Business Process ID# and Title	
Business Sub-Process ID# and Title	

C.6 Training/Communication
Address any training needs or communication to end users.

C.7 Additional Comments (optional)

PART D: RELATED DOCUMENTS

Date	Document Reference *List all documents that apply to the iSTAR Project. Includes any of the following: Blueprint, uPerform, role change form.*

PART E: REVIEW *(As needed at the discretion of the functional analyst)*

Completed By		Date	
End User Acceptance		Date	
Comments			

PART F: CONFIGURATION (FOR IT USE ONLY)

*F.1 Configuration Information *Was configuration performed as part of this requirement?*	Yes ☐	No ☐

F.2 IMG Path (optional)
Enter date and screen shot or written path of IMG nodes changed.

Date	IMG Path

EASD FUNCTIONAL/TECHNICAL DOCUMENT (FTD)	
*Business Process ID# and Title	
Business Sub-Process ID# and Title	

PART G: TECHNICAL REQUIREMENTS

DOCUMENT TYPE – *Enter # of applicable TR docs.*

Report (G.1)	*Forms (G.2)*	*Enhancement (G.3)*	*Interface (G.4)*	*Workflow (G.5)*	*GuiXT (G.6)*

G.1 Report < development id >

Report Name:

If this development has a report that outputs to an ALV grid, interface or printable report sheet, please fill in necessary information below; Examples would be: ZCOMBO or ZRETH

Batch, Foreground or both (Execute in the foreground, background or both? Does it need to be scheduled?)

Frequency / Timing (Need to run on demand, typically run daily or weekly, bi-weekly, yearly)

Data Retention (How long do we need to keep this data?)

Required Processing Flow / dependencies (If you get this, then do that)

Screen Layout (It should look like….)

Selection Criteria (The criterion to get data is…)

Required Fields (The output is…)

Field Name	Description	Field Type	Length

Data Volumes (How many records/yrs of data should the program read?)

Security/Authorizations (specify any security/authorization limitations needed)

Exception Handling (Don't allow this to happen if this does not happen correctly. Who is contacted how?)

G.2 Forms < development id >

Form Name:

If this development outputs to a printable sheet of some sort, please fill in necessary information below;
Examples would be: the Utility Bill, your pay stub or a Taxi Cab application

Batch, Foreground or both (Will this happen after hours on its own or with user interaction?)

Frequency / Timing (Need to run on demand, typically run daily or weekly, bi-weekly, yearly)

Data Retention (How long do we need to keep this data?)

Required Processing Flow / dependencies (If you get this, then do that) (Triggered by, Mailroom, workflow)

Form Layout (It should look like….)

Selection Criteria (The criterion to get data is…)

Required Fields (The fields needed are…)

Field Name	Description	Field Type	Length

Special Characteristics (ID any special characteristics such as: Page Size, Logo's, Barcodes, Format, Fonts, etc.)

Exception Handling (Don't allow this to happen if this does not happen correctly. Who is contacted how?)

G.3 Enhancement < development id >

Enhancement Name:

If this development includes an enhancement to SAP, please fill in necessary information below;
Examples would be: CIC0 adjustments or Water Automated Meter Read project

Batch, Foreground or both (Execute in the foreground, background or both? Does it need to be scheduled?)

EASD FUNCTIONAL/TECHNICAL DOCUMENT (FTD)

*Business Process ID# and Title	
Business Sub-Process ID# and Title	

Frequency / Timing (Need to run on demand, typically run daily or weekly, bi-weekly, yearly)

Data Retention (How long do we need to keep this data?)

Required Processing Flow / dependencies (If you get this, then do that)

Input / Output and Event triggers (Incoming data →triggers event →output data)

Screen Layout (It should look like….)

Selection Criteria (The criterion to get data is…)

Required Fields

Field Name	Description	Field Type	Length

Security/Authorizations (specify any security/authorization limitations needed)

Exception Handling (Don't allow this to happen if this does not happen correctly. Who is contacted how?)

G.4 Interfaces < development id >

Interface Name:

If this development includes an interface to/from SAP, please fill in necessary information below;
Examples would be: ADP, Telestaff, WAMR, Gateway

Batch, Foreground or both (Execute in the foreground, background or both? Does it need to be scheduled?)

Frequency / Timing (Need to run on demand, typically run daily or weekly, bi-weekly, yearly)

Data Retention (How long do we need to keep this data?)

Required Processing Flow / dependencies (If you get this, then do that)

EASD FUNCTIONAL/TECHNICAL DOCUMENT (FTD)

*Business Process ID# and Title	
Business Sub-Process ID# and Title	

Incoming File format (The data coming into SAP is…)

Field Name	Description	Field Type	Length

Selection Criteria (The criterion to get data is…)

Outgoing File format (The data going out must be in this format)

Field Name	Description	Field Type	Length

Data Volumes (The amount of data we are sending or receiving, duration of connection open to get the data through)

Security/Authorizations (specify any security/authorization limitations needed)

Interface Type: (File Share, Service (RFC) Call, Business Connector (SOAP) Call, Etc..)

Internal/External: (Is the interface internal or external to the organization?)

Transfer method: (FTP, SFTP, etc.…)

Encryption Required: (Y/N, If yes what are the encryption requirements.)

Exception Handling (Don't allow this to happen if this does not happen correctly. Who is contacted how?)

G.5 Workflow < development id >

Workflow Name:

If this development includes a workflow within SAP, please fill in necessary information below;
Examples would be: Time Approval; Purchase Requisition; Refund; Move-In/Out

Batch, Foreground or both (Will this happen after hours on its own or with user interaction?)

Frequency / Timing (Need to run on demand, typically run daily or weekly, bi-weekly, yearly)

Data Retention (How long do we need to keep this data?)

EASD FUNCTIONAL/TECHNICAL DOCUMENT (FTD)

*Business Process ID# and Title	
Business Sub-Process ID# and Title	

Required Processing Flow / dependencies (explain how the workflow should flow from beginning to end)

Input / Output and Event triggers (Incoming data →triggers event →output data)

Security/Authorizations (specify any security/authorization limitations needed)

Exception Handling (Don't allow this to happen if this does not happen correctly. Who is contacted how?)

G.6 GuiXT Enhancement < development id >

GuiXT Enhancement Name:

If this development includes a GuiXT enhancement to SAP, please fill in necessary information below;
Examples would be: PM017C – Water Create-Clone Order

Process Flow Diagram (Full description of the nature/workings of the GuiXT Enhancement, including process steps, desired results/objectives and event analysis. Clearly describe the nature of the input and output, business rules, scenarios in which the enhancement should be regarded or disregarded, rule dependencies, etc.)

Screen Layout (List relevant screens to be used, How they should look and work, screen shots, etc.)

Fields (List fields to be used, default values, deleted, fields with only a few options showing, etc.)

Field Name	Description (Type, field, tab, etc.)	Value (default)	Other Information

Exception Handling (Don't allow this to happen if this does not happen correctly. Who is contacted how?)

Interface Technical Specification – PI (Process Integration) <TITLE>

Please use a Technical Requirements Template for documenting functional/technical requirements. This document is exclusively for the technical design.

Document Control

Process Area	
SAP Sub Module	
Type of development	
SAP Component	

Development Change History

Any subsequent changes to this technical specification document after the official document approval shall be summarized in the following table.

Date	Changed By	Project ID	CR Number(s)	Description of Change

Interface Technical Specification – PI (Process Integration)
<TITLE>

1 General Information

Functional Design Spec ID:		**iStar Project ID**	
Interface Title:			
Contact Details:			
PI Developer:			
Phone Number:			
Email Address:			
Business/Functional Analyst:			
Phone Number:			
Email Address:			
Functional Area User Contact			
Primary:			
Phone Number:			
Email Address:			
Secondary:			
Phone Number:			
Email Address:			
Design Specification			
Run Frequency		**Languages**	
Priority:		**Complexity**:	
Source System		**Target System**	
Data Volume			
Triggers			

2 Description and Purpose

3 Assumptions

4 Issues

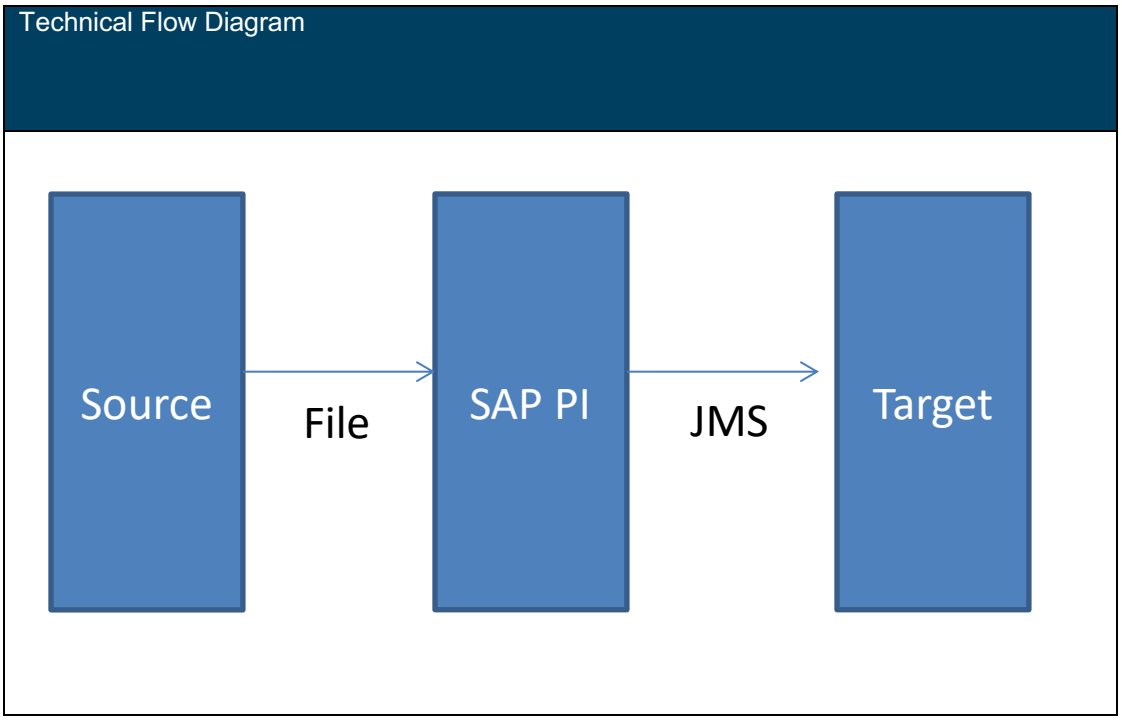
Issue #	Date Raised	Issue Description	Issue Resolution

5 Functional Details

5.1 Current functionality

5.2 Required functionality

6 Technical Details



7 Enterprise Service Repository Objects

7.1 Service Interface

Please copy the section if more than one sender or receiver interfaces are involved (e.g. because of message merges or splits).

Sender Service Interface	
Name:	
Namespace:	
Software Comp Version:	
Category:	☐ Inbound ☒ Outbound ☐ Abstract
Security Profile:	
Interface pattern	☒ Stateless ☐ Stateless XI3.0 ☐ Stateful ☐ TU&CC
Operation	[repeat section for additional operations in the service interface]
Name:	
Mode:	☒ Asynchronous ☐ Synchronous
Operation pattern	☒ Normal ☐ Commit ☐ Compensate ☐ Confirm
Message	
Namespace	
WSDL1	

Receiver Service Interface	
Name:	
Namespace:	
Software Comp Version:	
Category:	☒ Inbound ☐ Outbound ☐ Abstract
Security Profile:	
Interface pattern	☒ Stateless ☐ Stateless XI3.0 ☐ Stateful ☐ TU&CC
Operation	[repeat section for additional operations in the service interface]
Name:	
Mode:	☒ Asynchronous ☐ Synchronous
Operation patttern	☒ Normal ☐ Commit ☐ Compensate ☐ Confirm
Message	
Namespace	
Fault Message	
Fault Namespace	
WSDL[1]	

7.2 Imported Archive

Please copy the section if multiple required.

Imported Objects	
Type	☐ Idoc ☐ RFC

Category:	☐ Inbound ☐ Outbound ☐ Abstract
Mode:	☐ Asynchronous ☐ Synchronous
Name:	
Namespace:	
SW Component Version	

7.3 Message Type

Please copy the section if multiple required.

Message Type:	
Message Type Name	
Description	
SW Component Version	
PI Repository Namespace	
XML Message NamesR2Rce	
Underlying Data Type	
Data type NamesR2Rce	

Message Type:	
Message Type Name	
Description	
SW Component Version	
PI Repository Namespace	
XML Message Namespace	
Underlying Data Type	
Data type Namespace	

7.1 Data Type

Please copy the section if multiple required.

Data Type:			
Data Type Name			
Data Type Namespace			
SW Component Version			
Folder			
Classification	☒ Freestyle	☐ Core Data type	☐ Aggregated Data Type
Data Type:			
Data Type Name			
Data Type Namespace			
SW Component Version			
Folder	NA		

Classification	☒ Freestyle	☐ Core Data type	☐ Aggregated Data Type

7.2 Mapping

Please copy the section if multiple required.

Operation Mapping	
Name	
Namespace	
Mapping Sequence	

Mapping Program General (duplicate if needed)				
Name				
Namespace				
Complexity	☐ high	☒ medium	☐ low	
Implementation Type	☒ graphical	☐ Java	☐ XSLT	☐ ABAP
Mapping Tables	[optional: insert mapping table name(s), if value mapping is used]			

Basic Logic of Mapping

Mapping Documentation

Mapping Documentation
[Java/XSLT/ABAP Mapping source code]

7.1 Value Mappings

NA

7.2 Function Library/UDF Used

Please copy the section if multiple required.

Functions	
Name	
Namespace	
Folder	
Description	
Message Mapping	
Source Code	

7.3 Imported Archive

Please copy the section if multiple required.

Imported Archive		
Name		
Namespace		
Folder		
Descriptions		
File Type	☐ JAR	☐ ZIP

8 Integration Directory Objects

8.1 Integration Overview

Configuration Scenario / Folder	
Name:	
Folder:	
Additional Description[2]:	

Receiver Service	
Service Type:	☒ Business System ☐ Business Component ☐ Integration Process
Party	*
Service	
Integration Process	
Additional Description[2]:	

Sender Service	
Service Type:	☒ Business System ☐ Business Component ☐ Integration Process
Party	*
Service	
Integration Process	
Additional Description[2]:	

8.2 Sender Communication Channel

General			
Communication Channel			
Adapter Type			
Adapter Engine	☒ central	☐ decentral	☐ PCK

R2Rrty		Service	
Service Type	☒ Business System	☐ Business Component	☐ Integration Process
Integration Process	N/A		
File Adapter			
Transport Protocol	☐ FTP ☐ FTPs ☒ NFS		
Message Protocol	☐ File ☒ File Content Conversion		
Target Directory			
Create Target Directory	☐		
File Name Schema			
FTP Server	NA		
FTP Port	NA		
FTP Data connection	NA		
Additional Information			

8.3 Receiver Communication Channel

General			
Communication Channel			
Adapter Type			
Adapter Engine	☒ central	☐ decentral	☐ PCK
R2Rrty		Service	
Service Type	☐ Business System	☒ Business Component	☐ Integration Process
Integration Process	N/A		
File/FTP Adapter			
Transport Protocol			
Message Protocol			
Target Directory			
Create Target Directory			
Additional Information			

9 Error Handling

Requirements for Error Handling, Restart and Monitoring	
Data Quality	
Requirement Description	

10 Security Requirements/ Authorization Details

11 Additional Information and attachments

t Test Plan

unctionality - test cases that ensure the interface functions as it should. (e.g screenshots from target system and SAP PI)

on	Step	Step Description	Test Data	Expected Result	Actual Result	Executed By/Date	Re

- special logic or exceptions (e.g. do not process Government Markets customers, only process pre-packs)

on	Step	Step Description	Test Data	Expected Result	Actual Result	Executed By/Date	Re

dling - functionality in case of errors (e.g. Customer not found, Record already exists)

on	Step	Step Description	Test Data	Expected Result	Actual Result	Executed By/Date	Re

Technical Specification **<TITLE>** **Reference: XTS-XX000** **Business Process: X-XX000** **Process Title: <Process Title>** **Area : <Area>** **Modules Affected: <Module Name>** **Functional Owner: <Owner Name>**	**Priority: N/A** **Due Date: 00/00/0000**

DEVELOPMENT DESCRIPTION:

Please use a Technical Requirements Template for documenting functional/technical requirements. This document is exclusively for the technical design.

CONTACTS

Contact	Contact Person
Functional Architect (SAP)	
Technical Architect (SAP)	
Technical Team Lead	

Development Change History				
Any subsequent changes to this technical specification document after the official document approval shall be summarized in the following table.				
Date	**Changed By:**	**Project ID:**	**CR Number(s)**	**Description of Change**
				Initial Version

RELATED FUNCTIONAL / TECHNICAL SPECIFICATIONS

Specification	Description

PART A – DESCRIPTION

DEVELOPMENT NAME: *Title or Name of Development*

PURPOSE: *Description and objective of development, including the business requirement.*

BUSINESS REASON: *State the Business Process ID related to the development and/or business requirement/s and justification/s.*

OWNER / DEPARTMENT: *Owner of development or main user/s e.g. Customer Service Department etc.*

PART B - TECHNICAL DESIGN

OBJECT INFORMATION

Object List

List each custom object that is part of this solution e.g. programs, function modules, tables, BOR objects/methods etc

Object Name	Object Type	Description

Table/Structure name:	
Table/Structure description:	
Table/Structure layout:	

Field Name	Field Description	Data Element	Field Type	Length	Key Field (Y/N)	Foreign Key (Table Name)	Comments (e.g. referential integrity)
MANDT	Client	MANDT	CLNT	3	Y		

SAP Development Attributes	
Development Class:	
Transport Number:	
Message Class:	

Technical Specification **DEVELOPMENT <Development Name>** **Reference: <XTS-XX000>**	**Priority: (U/H/M/L)** **Due Date: MM/DD/YY**

DESIGN SPECIFICATION

Processing type	*(batch, dialog)*
Table update method	*(BDC, direct insert, direct update)*
Interface/job frequency	*(real-time, on-demand, daily, business days only, weekly, etc.)*
Volume of data	*(hourly or daily transaction volumes)*
Time dependencies	*(execute after midnight, must complete before 6:00 AM, etc.)*
Job dependencies	*(identify jobs/processes that must complete before/after program is run)*
Affected by upgrade?	*(yes, no, maybe)*

Technical Architecture Approach (brief overview):

Provide a description of the program's design/structure flow

Logic/Flow:

Provide a concise description and/or pseudocode for each report/program, function module, workflow etc and supplement with a flow diagram where appropriate

Program ZXXXXX
…

(Delete the attachment below if this is not a Workflow specification document)

Detailed Workflow Specification

Table Access Diagram:

Provide table access diagram with primary key relationships

Screen Layout:

Provide captures of selections screens and Screen Painter dialogs used

User Exits/Business Add-ins:

List user exits or BADIs used with brief descriptions

Error Handling:

Provide error handling logic for each step and/or flow diagram

Technical Specification **DEVELOPMENT <Development Name>** **Reference: <XTS-XX000>**	**Priority: (U/H/M/L)** **Due Date: MM/DD/YY**

Authorizations / Security Control:

Authorization objects and/or other security related information

Issues/Assumptions/Notes:

Signoff

This Technical Specification document has been verified and accepted as meeting all the input and output requirements with buy-in from affected business units.

Tech Team Lead	**Functional Team Lead**

PART C – UNIT TEST PLAN

Normal Functionality - test cases that ensure the program functions as it should. (e.g. updates fields correctly, processes all records)

Function	Test Case - Include Test Data Used	Expected Result	Actual Result	Q/A
1.				
2.				

Exception - special logic or exceptions (e.g. do not process some types of customers)

Function	Test Case - Include Test Data Used	Expected Result	Actual Result	Q/A
1.				
2.				

Error Handling - functionality in case of errors (e.g. Customer not found, Record already exists)

Function	Test Case - Include Test Data Used	Expected Result	Actual Result	Q/A
1.				
2.				

Production/Support - functionality to help data center (e.g. restart logic, processing statistics, abnormal termination)

Function	Test Case - Include Test Data Used	Expected Result	Actual Result	Q/A
1.				
2.				

UTP Approvals – signature should be obtained prior to technical design sign-off.

Name	Signature	Date
<Functional Architect (SAP)>		
<Functional Architect (Legacy)>		

UTP Execution Results Approvals – signature indicates the UTP results were reviewed and approved.

Name	Signature	Date
<Functional Architect (SAP)>		
<Functional Architect (Legacy)>		

Test Script Name: (using the HPQC naming Standards - Module_Type of Test_Description)

Test Owner(s): Tester(s): Test User id:	Test Environment: Test Execution Date: Final Status: [ ] Passed [ ] Failed

PART A – DESCRIPTION OF TEST

Objective/ Summary		
Scenario Description for Test Cases		
Scenario #	**Detailed Scenario Description**	**Pre Condition(s)**

PART B – DESIGN STEPS

No.	Step Description	T-code	Expected Result Output Data / Result	Actual Results
1.				
2.				
3.				
4.				
5.				
6.	End of Scenario			

Module 3: Move Ins

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Deleted: 19
Deleted: 20
Deleted: 20
Deleted: 22
Deleted: 24
Deleted: 25
Deleted: 25
Deleted: 26
Deleted: 27
Deleted: 28

Module 3 Objectives

BY THE END OF THIS LESSON, YOU WILL BE ABLE TO:

1. View an account in SAP Shadow to determine if the account is owner allocated.
2. Create an owner allocation on an account by completing a scenario provided by your instructor.
3. Deactivate an owner allocation by completing a scenario provided by your instructor.
4. Change an owner-allocated account to include or exclude an installation as assigned by your instructor.
5. Correctly identify a premise using the ID Premise action button.
6. Analyze an account to determine the correct deposit amount to charge as listed on the Deposit Quick Reference Card.
7. Successfully create a deposit for the correct amount on an account during the move in process.
8. Review a scenario to determine whether a residential account meets the criteria for a deposit waiver as outlined in CS Policy 3.2.
9. Successfully convert a deposit to non-cash.
10. Select the correct notification to send when processing a move in.
11. Complete a move in for an unknown business partner with 90% accuracy.
12. Complete a move in for a known business partner with 90% accuracy.
13. Successfully complete all steps of changing a move in by completing a scenario provided by your instructor.
14. Successfully complete all steps of reversing a move in by completing a guided exercise with the instructor.

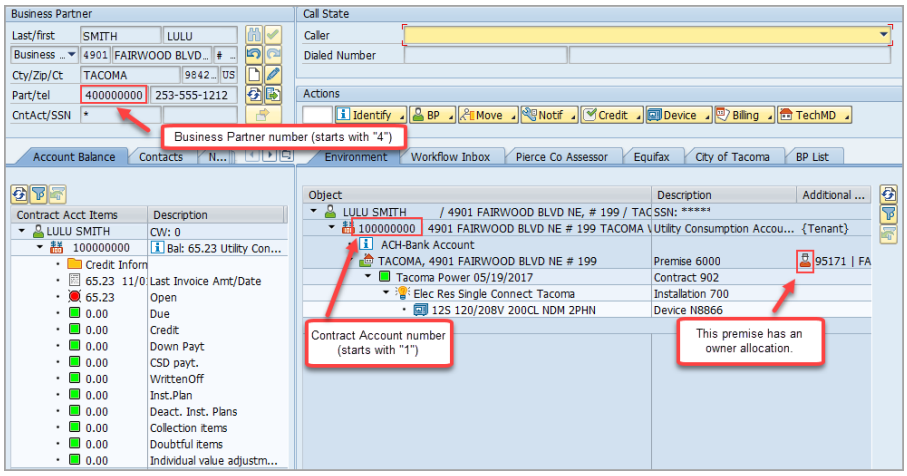
Owner Allocations

What is an Owner Allocation?

Some owners of rental properties prefer to have services left on in between tenants. The owner allocation process performs an automatic move in when a tenant calls for a move out.

Note: Owners can avoid being assessed service establishment fees each time service is changed back into their names by setting up an owner allocation (i.e. Landlord Service Continuation Agreement).

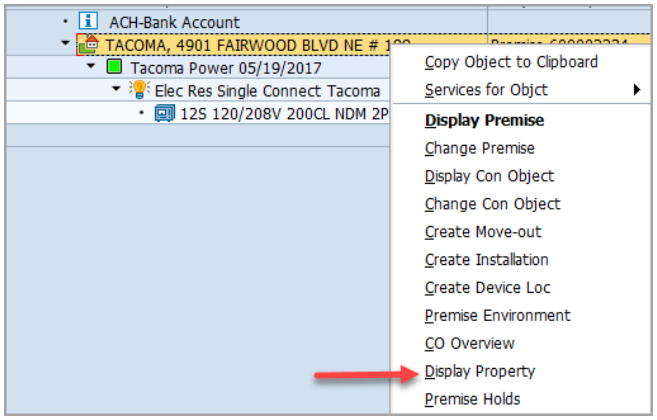
Viewing an Account



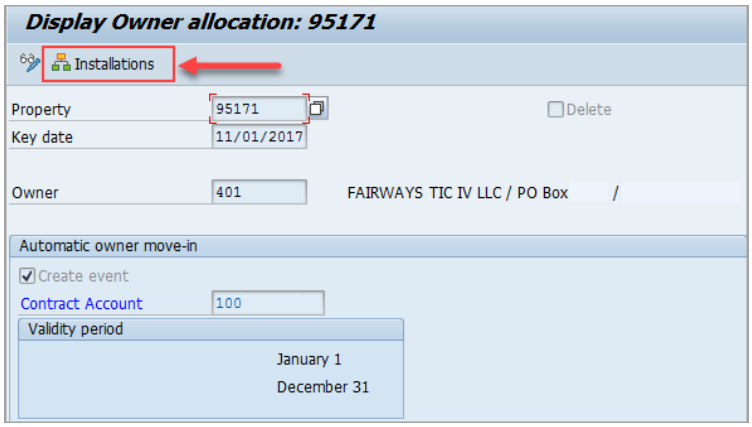
Module 3: Move ins

VIEWING AN OWNER ALLOCATION FROM A TENANT'S ACCOUNT

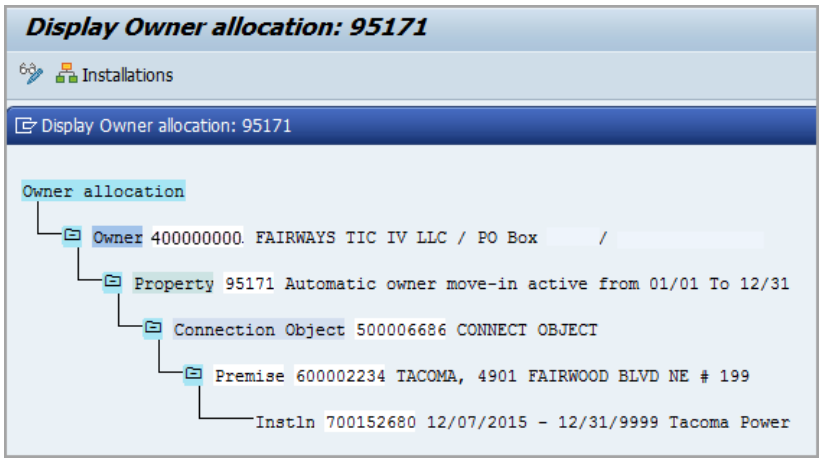
1. Right-click on the premise and choose **Display Property** from the drop-down menu.



2. This will bring you to the display owner allocation screen. Also from here, you can choose the installations to view that are owner allocated by clicking on **Installations**.



The following screen is displayed:



LANDLORD SERVICE CONTINUATION AGREEMENTS

Owners who request to have owner allocations on services are required to complete a Landlord Service Continuation Agreement.

For more information, refer to the following documents, located in the Reference Library:

- LSCA Agreement and Acceptance Form – *located under Forms, Templates and Letters*
- LSCA - Confirmation Letter – *located under Forms, Templates and Letters*
- LSCA - Incomplete - *located under Forms, Templates and Letters*
- LSCA - Reminder Letter - *located under Forms, Templates and Letters*
- LSCA Revocation Warning Letter - *located under Forms, Templates and Letters*
- LSCA Revocation Letter - *located under Forms, Templates and Letters*

Owner Allocation - Create

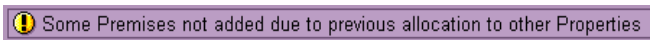
Before creating an Owner Allocation in SAP, the Landlord Service Continuation Agreement forms must be completed.

Refer to: CSCSS-1111 Managing Landlord Service Continuation Agreements (Owner Allocation)

Before you Begin – Helpful tips

You will need the connection object number to create the owner allocation. If you are creating an owner allocation for a larger complex, it is helpful to type the number ahead of time in your Notepad so you won't have to search for it. For five units or less, CSRs can set up the Landlord Service Continuation Agreement for the residences. For over five units, send the agreement to the back office for processing.

- It is helpful to check the premises for owner allocations before you begin this process. If there are owner allocations on another BP (such as when a property has changed ownership), you must remove them if you want your current BP to have all the premises in the same connection object on owner allocations. If you do not complete this step, and there is already an owner allocation on the property, you will receive this message:

  The previous owner allocation will need to be removed before you may proceed with the new owner allocation.

Refer to CSTSK-1111.1-CSR Processing Landlord Service Continuation Agreements (Owner Allocation) for instructions on how to process a landlord service continuation agreement. The task is located in the Reference Library and includes:

- How to process the initial request from the landlord
- What to do with the paperwork once it is received
- How to create the owner allocation

Owner Allocation and Solid Waste

When setting up owner allocations, typically the owner of a property will opt not to have the solid waste set up as owner allocated. If the property is occupied, the tenant will pay for the solid waste. **Always move in Solid Waste with the other services.**

TEN-DAY LIST

At times, a service may be moved out and an account closed due to non-payment. This procedure is known as the "Ten-Day List."

An account is moved out due to the "ten-day list" when a service has been disconnected due to non-payment and payment is not received to restore service. Here's how it works:

1. Day 1 – Field Investigator disconnects service due to non-payment
2. Day 5 – If service has not been restored, a notification is sent through the SAP workflow for the Field Investigator to verify the service is off. If there is both power and water at the premise, a credit follow up and a verify notification will be sent. The Field Investigator will disconnect the remaining service and ensure the disconnected service is still off.
3. Day 10 - If payment is not received and service restored, the service is moved out and the account is closed by a Lead or the CST in field operations.

When the move out occurs due to the 10-day list, Field Operations will temporarily deactivate the owner allocation until it is confirmed the tenant has moved out or the owner requests to reinstate the service. At that time, the CSR/CST will manually reinstate the Owner Allocation and manually move back in the services by adopting the owner allocation account number.

Note: When the owner allocation is reinstated, the service establishment fees will need to be removed. (manual move in automatically adds the service establishment fee, which would be waived had the owner allocation been active and a normal move out completed).

Owner Allocation – Activate/Deactivate

You can determine when an owner allocation is active when the icon appears "dressed":

Active **Deactivated**

To activate or deactivate the owner allocation, let's look up the following tasks, in the Reference Library.

CSCSS-1111 Managing Landlord Service Continuation Agreements (Owner Allocation)

CSTSK-1111.4-CSR Activating a Landlord Service Continuation Agreement (Owner Allocation)

CSTSK-1111.5-CSR Deactivating a Landlord Service Continuation Agreement (Owner Allocation)

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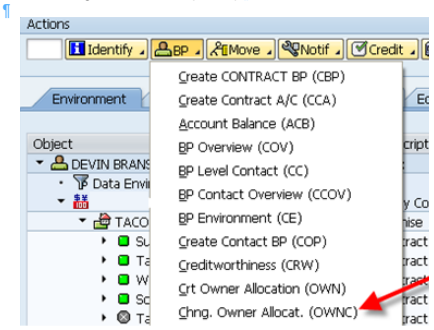
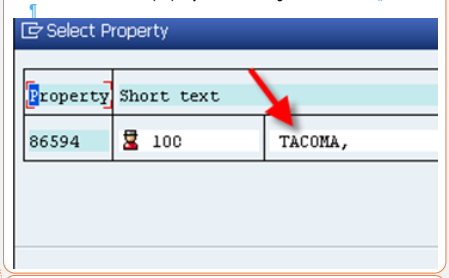
Deleted: Pull up the owner's account that you are changing. Click on BP tab from Action bar.
Select **Chng. Owner Allocat. (OWNC).**



<#>Select the Change button.

<#>Select the correct property and click the green checkmark.



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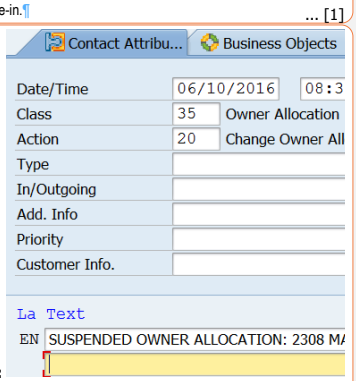

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Owner Allocation - Change Installations

There are times when you may need to add or remove an installation from an owner allocation. For example, an owner might change his or her mind and decide to have one or more services disconnected between tenants. When this occurs, you can reassign the installations so they won't be moved into the owner's name

Refer to the task document CSTSK-1111.3-CSR Changing a Landlord Service Continuation Agreement (Owner Allocation), located in the Reference Library.

Reverse Owner Allocation

Refer to the task document CSTSK-1111.2-CSR Terminating Landlord Service Continuation Agreements (Owner Allocation), located in the Reference Library.

Introduction to Move ins

ABOUT MOVE INS

You will complete move ins daily as a CSR. Below is a list of steps in the move in the process.

Move In Checklist

- ❒ Identify the premise
  - Check for holds and liens
  - Read the contact notes
  - Identify the account holder as owner or tenant
  - Check for outstanding balances
  - Check the status of the service: on or off
  - Review the installations

- ❒ Complete a BP search to determine if BP is known or unknown. If the BP is known, verify there is no delinquent balance.

- ❒ Begin the move in process
  - Verify move dates
  - Select installations
  - Enter contact note
  - Enter BP information (Phone number, email, etc.)
  - Select “owner” or “tenant”

- ❒ Complete the move in
  - Determine deposit requirements
  - Complete notifications

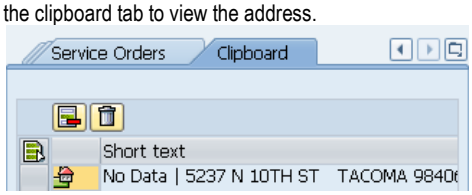
Identifying a Premise

Moving in utility services for customers will be one of your primary duties. Identifying a premise will be the first step you will take to begin the move in process.

Refer to: CSTSK-1106.3-CSR Conducting a Premise Search , located in the Reference Library.

HELPFUL HINT!

After you identify the premise, click the green arrow to return to the CIC; then, in the navigation area, view the clipboard tab to view the address.



SAP SEARCH: TOO MANY HITS

At times, you will search for a premise and get a message: "Too many hits."

To narrow your search, refer to the SOP document titled, "*Premise search when SAP shows too many hits*", located in the Reference Library.

Deposits and Waiver Options

Deposits

When an unknown business partner calls to establish utility service, you will verify a customer's identity through Equifax Score prior to the move-in process. If the score comes back and the customer is not required to pay a deposit (tenant), you will just continue the move-in process. If the customer's score requires a deposit (tenant), and the customer is on the phone with you, discuss the deposit and waiver options at that time with the customer.

Deposit Requirements

Most residential home owners are not required to pay a deposit on their residence because we hold a utility lien on the property if they fail to pay a utility bill.

If a deposit is required, the customer is notified in several ways:

1. Verbally by the CSR over the phone or in person
2. A written deposit notification letter (system generated)
3. Deposit is on first bill (although the due date of the deposit may be before the bill is issued)
4. A disconnection notice is issued because the deposit was not paid (system generated)
5. A Field Investigator leaving a disconnect notice at the door.

A disconnection notice will be sent or left only if there has been no response or payment agreement on the deposit within 30 days of the account opening.

Deposit Quick Reference

Deposits are determined based on the type of residence and the types of service a customer has.

Currently, there is no deposit required for Solid Waste or Wastewater.

Note: When a score is requested, the results are valid for one year.

The Deposit Quick Reference Card is also located in the Reference Library. It is called Deposit and Waiver Options.

* * * * * * * * *

Deposits

Residential (Policy 3.2)

Power deposits are based on the type of residence:

Residential housing up to 4 units	$200.00
Apartments 5 units or above	$100.00
Water	$75.00
Solid Waste	$0.00
Wastewater	$0.00

Commercial (Policy 3.3)

Power = the highest 2 months' charges for the service premises in the prior 24 months

Water = the highest 2 months' charges for the service premises in the prior 24 months

Solid Waste = 4 times the monthly rate

* * * * * * * * *

Rev. 2/15

PROBLEMS AND TROUBLE SHOOTING

Even though we have verbally discussed the deposit with the customer, we cannot guarantee that the welcome letter, which includes the deposit information, will reach the customer. Below are common reasons that may cause the letter not to reach the customer:

- Wrong customer name on mailbox
- Letter thrown out with other "junk mail"
- Letter lost or destroyed in postal system
- Roommate got letter and did not tell the other
- High turnover in apartment or rental addresses
- Bi-monthly customers may have the deposit due prior to the first bill.

DEPOSIT REFUNDS

When a residential customer pays a deposit, it will be released to their account if they maintain good credit with the utility for one year, or upon move out on the final bill. Residential deposit refunds that remain on an account when it closes and final bills are automatically refunded to the primary BP. The refund is processed in the 13th month and released to the active contract account.

A commercial deposit is also returned after 12 months of good credit.

LOST CHECKS

When a customer asks about his/her residential deposit refund as a result from a credit on the final bill, and the utility indicates that it has been returned to the customer, it may be necessary to send the customer an "Application for Duplicated Instrument" Affidavit. This occurs if there has been sufficient time between the return refund date and the customers' inquiry for the check to be received. If our records show it has *NOT* been cashed, begin the affidavit process. These affidavits must be notarized. If the refund check *has* been cashed, inform the customer of the date. If necessary, a copy of the cashed check and information of who cashed it can be obtained. Often, customers have simply forgotten they received the check.

The affidavit is a template in the Reference Library. The Standard, Tasks and Template regarding lost checks will be covered in Module 7, Payments.

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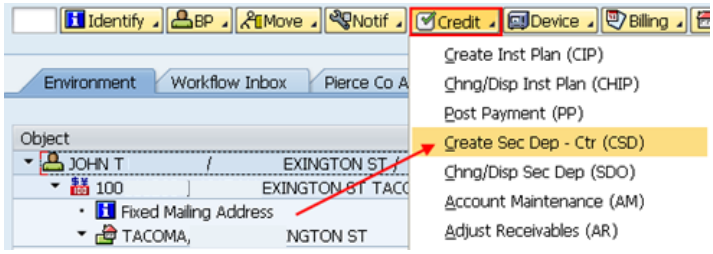
Deleted: are available in hard copy form from the front line or Support Services. Follow normal correspondence procedures (covered later in the training) to send the affidavit to the customer. ¶

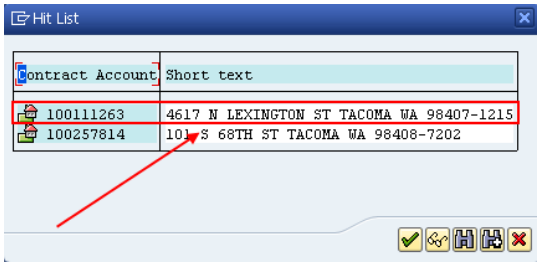
Create Deposit

Follow these instructions to create a deposit if a deposit was not created during the move in process.

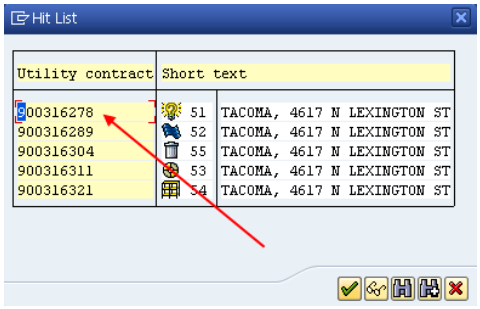
1. Start the transaction by populating the Customer Interaction Center (CIC) with a Business Partner (BP).
2. Click Credit to get the drop down menu and select **Create Sec Dep – CTR (CSD)**.



If the business partner has more than one contract account, this screen will appear. If it does, select the account number the deposit will be created on and click .

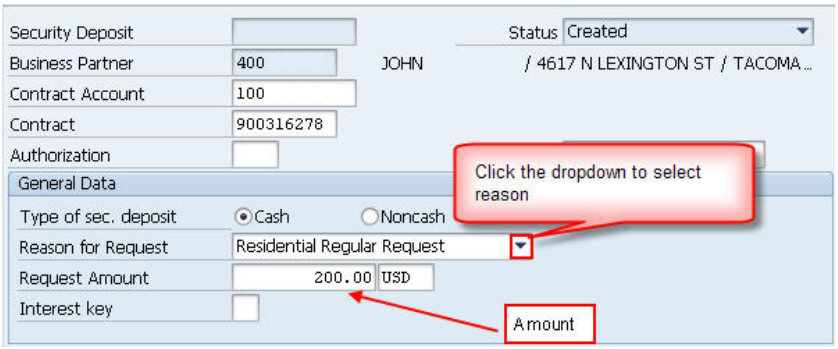


3. A list of the BP's utility contracts appears. Select the power contract and click .



4. On this screen, enter the following information:

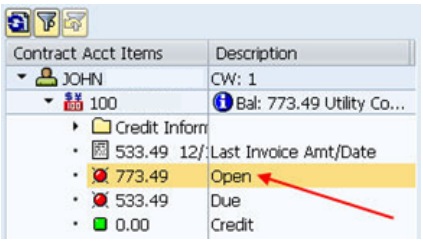
Reason for Request	Why the deposit is requested. **Example:** Residential Regular Request
Requested Amount	Amount requested for the specific contract. **Example:** $200.00



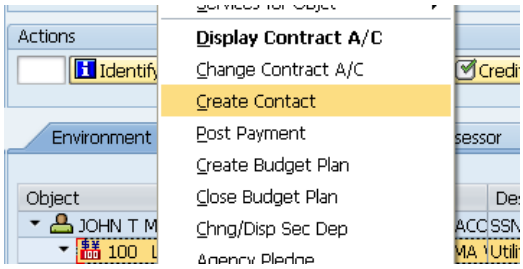
5. Click icon to complete this transaction and you will be returned to the CIC. From here, if you have more than one contract for which to request a deposit, you will do so here. In this example, this is a five-service account, so we will also request a deposit for water (repeat steps 2 – 4).

Remember - it is very important to choose the same **Reason for Request** for all contracts or the deposit letter will error.

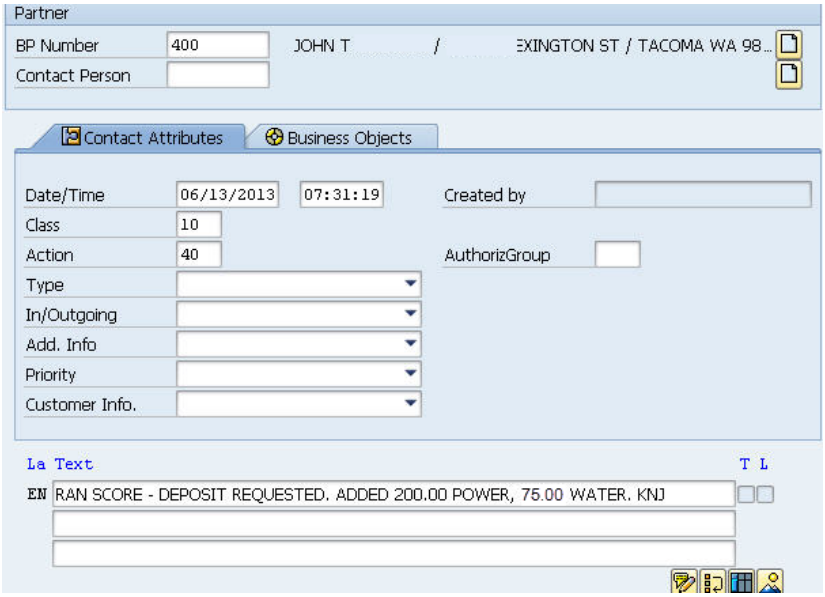
6. Click in the navigation area to see the deposit amount displayed on the account balance.



7. Right-click on the contract account to get the drop down menu. Select **Create Contact.**



8. Select class and action 10/40. Enter your note in the text field.



9. Click . Refresh the Navigation area and you can view your contact.

Residential Deposit Waiver Options

A complete list of residential waiver options may be found in the Customer Services Policies, located in the Reference Library. Residential deposit information is listed under policy 3.2.

For the customer service standard regarding deposit waivers for residential properties, see CSCSS-1118 Waiving Residential Deposits, located in the Reference Library.

For instructions on how to process a residential waiver, refer to CSTSK-1118.1-CSR Waiving Residential Deposits, located in the Reference Library.

Note: Mobile home owners are considered tenants if they live in a park or do not own the land.

Commercial Deposit Waiver Options

Commercial deposit waiver options are similar to residential, but with some significant differences.

For the customer service standard regarding deposit waivers for residential properties, see CSCSS-1119 Waiving Commercial Deposits, located in the Reference Library.

Letter of Credit

A letter of credit (LOC) is also known as a reference letter. This letter is a record used to verify a customer's payment history with a given utility, usually used to waive a deposit request. The letter may be faxed or mailed to the customer or directly to the requesting utility.

Refer to CSTSK-1118.2-CSR Processing Letters of Credit, located in the Reference Library.

Payment Guarantee Waivers

To learn more about payment guarantee waivers, please complete the e-learning course titled, "**311(for CSRs)-Payment Guarantees**." During the course, you will review the following SOPs:

- CSCSS-311 Processing a Payment Guarantee (Owner Guarantee)
- CSPRO-311.1 Processing a Payment Guarantee (Owner Guarantee)
- CSTSK-311.1-CSR Receiving Requests for Payment Guarantee (Owner Guarantee)
- CSTSK-311.2-CSR Processing a Payment Guarantee

uPerform Course: Now you will take the uPerform course titled, " 311(for CSRs)-Payment Guarantees."

KNOWLEDGE CHECK

Read each scenario below and determine whether the account meets the criteria for a deposit waiver.

Eligible for waiver?		Scenario
❑ Yes	❑ No	Joe calls to start service at a home he just purchased. Joe was a tenant at the Drake Apartments for 3 years and has no unpaid charges.
❑ Yes	❑ No	Mary is a tenant and is moving into an apartment on M street. She currently lives at an apartment on Center Street. You check her account and see she has 22 credit worthiness points.
❑ Yes	❑ No	Austin is a tenant who calls to move in service. You run Equifax Score, and it indicates a deposit is required. Austin is frustrated as he is moving from Oregon and did not have to pay a deposit for his utilities there. You explain the deposit waiver options, and Austin indicates he will request a letter of credit from his former utility. A week later, a letter arrives from Portland Gas and Electric (PG&E) regarding Austin's payment history. It indicates Austin had service with PG&E for 38 months and had no delinquent payments.
❑ Yes	❑ No	Jeri is moving into a house on 84th street that is owned by Larry. Jeri does not meet the requirements for a deposit waiver, so Larry agrees to do a payment guarantee for Jeri. Once the paperwork is received and validated, is Jeri eligible for the deposit waiver?
❑ Yes	❑ No	Margaret is a tenant who calls to move in service. You run Equifax Score, and it indicates a deposit is required. Margaret states she can get a Letter of Credit from Puget Sound Energy showing that she has an excellent payment history with them. She had service at PSE for 10 months.
❑ Yes	❑ No	Bill is a tenant at 123 Jump Street, and he purchased a new home last month. His house has finally closed, and he is ready to move in and establish service. You look at his account and notice he has 42 creditworthiness points.
❑ Yes	❑ No	Ruth just purchased a mobile home in the Whispering Pines Mobile Home park. She previously rented a home in south Tacoma and is excited to establish service in her new home. You review her account in SAP and see she has 14 credit worthiness points.

Notifications

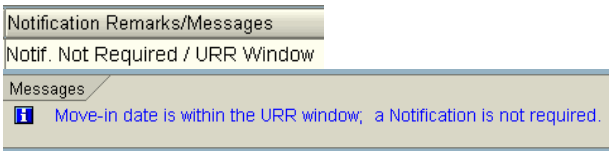
Creating a notification is the final step of the move in process. A **notification** is a work request sent to personnel in Field Operations to perform actions or gather information on devices.

Below are the most commonly used notifications used by CSRs.

CDSC-01	Disconnect meter-Electric
CDSC-02	Disconnect meter-Water
CRDE-01	Read electric meter Service
CRDW-01	Read water meter Service
CREC-01	Dunning Reconnect – Electric
CREC-02	Dunning Reconnect – Water
CREC-03	Service Reconnect – Electric
CREC-04	Service Reconnect – Water
CAFT-01	PWR - After hours reconnect at meter
CAFT-02	PWR - After hours reconnect at meter – no charge
CAFT-03	WTR-After hours reconnect at meter
CAFT-04	WTR-Cut in error-reconnect no charge
CAFT-07	PWR-After hours reconnect – day charge
CAFT-08	WTR – After hours reconnect – day charge
CGWR-01	GATEWAY Reconnect
CGWR-02	GATEWAY Reconnect for dunning

The status of the device before performing the move in determines the type of notification to create.

- URR (Use Regular Read). If there is a URR message on the notifications screen, you **do not** send a notification. There will be a message in the contacts area and in the message center on the notification screen.



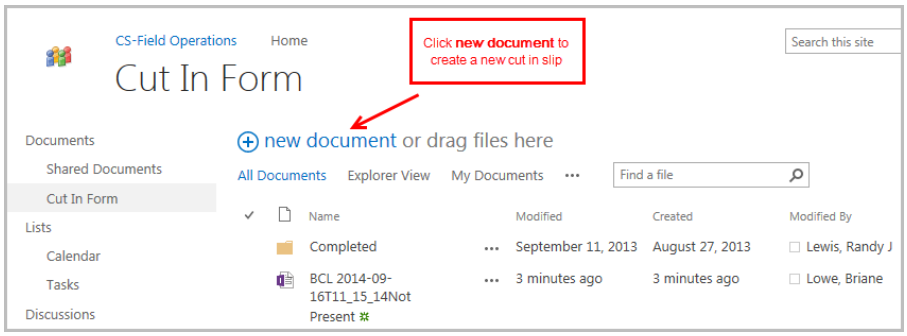
- Service on: device is connected, need read only – CRDE01 or CRDW01
- Service off: device is disconnected, need reconnect – CREC03 or CREC04
- Service off: device is disconnected, need reconnect and it is past 12:00 noon – CAFT01 or CAFT03
- Service has a pending disconnect request. Follow the OHS (Other Has Signed) process, which will be covered in Module 5

Module 3: Move ins

Same Day Requests for Reconnection

Be aware of what time you are creating a notification. For all same-day notifications, dunning or service notifications, a SharePoint Cut In Form must be completed.

http://cityshare/teams/CS/FieldOperations/Cut%20In%20Form/Forms/AllItems.aspx



Most common mistakes made on Service Notifications

1. **Incorrect job/task code** – If you are unsure about what code to use, please ask.
2. **Improperly filling out SharePoint Form** – Incorrect forms causes delays and can result in costly mistakes if a Field Investigator gets sent out in error.
3. **Wrong date for job/task** – The date on the notification defaults to the next business day. If the business partner is requesting a same day reconnect, you will need to change the date of your notification.

The following information is required on anything sent to the dispatcher and must be included on the SharePoint cut-in form:

1. Notification number(s)
2. Contract account number
3. Complete address
4. Device number(s)
5. Action that needs to take place
6. CSR initials
7. Date

Do not send the SharePoint cut-in form after 4:30 pm. The notifications must be called in directly to Dispatch at 502-8854.

Move In – Unknown BP

For instructions on how to verify identity, refer to the standard *CSCSS-101 Verifying Applicant Identity.* The task document, *CSTSK-101.1-CSR Verifying Applicant Identity (Equifax Score),* is covered in Module 10.

For instructions on moving in an unknown BP, refer to *CSCSS-1106 Moving in Service* and the task document *CSTSK-1106.2-CSR Moving in Service (Unknown BP).* These documents can be found in the Reference Library.

Notes:

Move In - Known BP

The procedure for moving in a known BP is very similar to moving in an unknown BP. First, search for the existing BP and verify that the account is for the person you are speaking to or is being represented. Be sure to confirm the customer's identity.

Identity Verification

For instruction on how to verify customer identity and handle personal identifiers, refer to the following documents located in the Reference Library:

- *CSCSS-102 Verifying Customer Identity*
- *CSTSK-102.1-CSR Verifying Personal Identifier*
- *CSTSK-101.2 Verifying Picture ID*

Once you have identified the business partner,

- Review the BP's account information.
- Review the owner allocation option if the BP is moving into an address that will be used as a rental.

Important! When you are doing a move in for an owner who will not occupy the premise and they do not want Solid Waste, you must go back to the previous occupant and separately do a move out for the Solid Waste.

Complete the Move In

Refer to CSTSK-1106.1-CSR Moving In Service (Known BP), located in the Reference Library.

Note: If the known BP has other active service account(s), verify if they would like to have continued service, or process a move out.

Change Move In

At times, you will need to make changes to a pending move in. Two specific types of changes are covered in this module:

1. Change Move In Date
2. Change Move In Document

Refer to *CSTSK-1106.5-CSR Changing a Move In* , located in the Reference Library.

Notes for Change Move In:

Reverse Move In

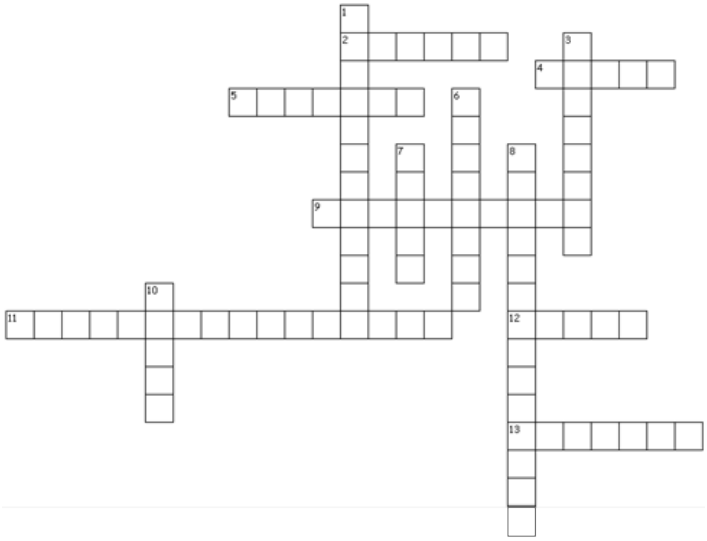
At times, you may need to reverse a move in. When this occurs, there are two important things to keep in mind:

1. If the move in you need reverse resulted in a move out of a previous tenant or owner, the move out must also be reversed.
2. Any active notifications need to be cancelled.

For instructions on how to reverse a move in, refer to *CSTSK-1106.4-CSR Reversing a Move In* , located in the Reference Library.

CROSSWORD

Test your knowledge of the move in process!



2. Connection _____
4. Solid _____
5. Identify this before creating a move in
9. Always moved in with Water
11. Deposit waiver option for tenants but requested by owners
12. _____ Allocation
13. Program used to verify a customer's identity

1. A work request for Field Operations
3. _____ Service Continuation Agreement
6. Personal identifier chosen by customer
7. $75.00 deposit
8. Used to verify customer's payment history with a utility
10. Type of BP that is not unknown

Managing Customer Passwords

After customers are moved in, they sometimes decide they prefer using a password on their accounts as the personal identifier.

To add, change, or remove a password from a customer's account, please refer to the following documents located in the Reference Library:

- *CSCSS-104 Managing Customer Passwords*
- *CSTSK-104.1-CSR Adding an Account Password*
- *CSTSK-104.2-CSR Changing or Removing an Account Password*

KNOWLEDGE CHECK: MANAGING CUSTOMER PASSWORDS

1. When a customer adds a password to an account to serve as the unique identifier, does the customer also need to provide the last four digits of the Social Security number?

2. When the CSR creates the contact note regarding the password, is the note added at the contract account level or the BP level?

3. Who is required to provide the password on the account in order to discuss the account details?

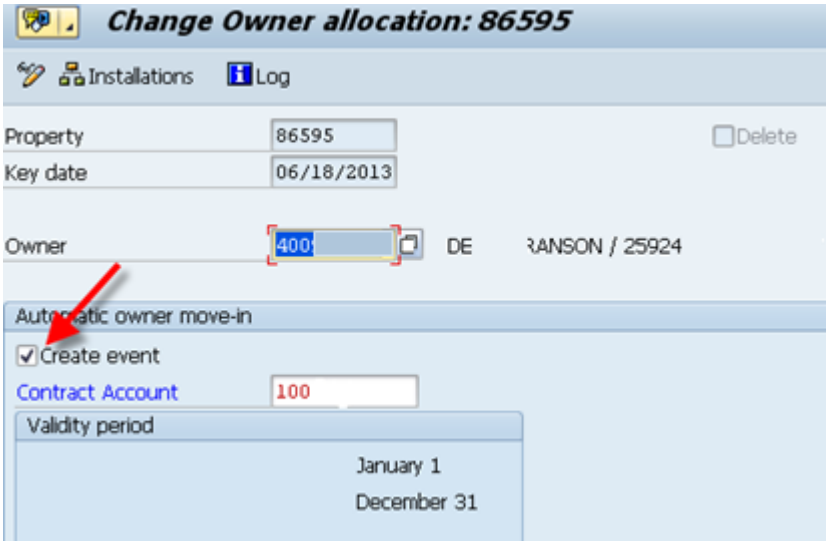
4. What do customers need to do if they cannot provide the password to the account?

5. Who is authorized to change the password on an account?

6. What information must be provided by the customer in order to change or remove the password from an account?

Page 8: [1] Deleted **Pinkerton, Beverley** **1/18/18 10:46:00 AM**

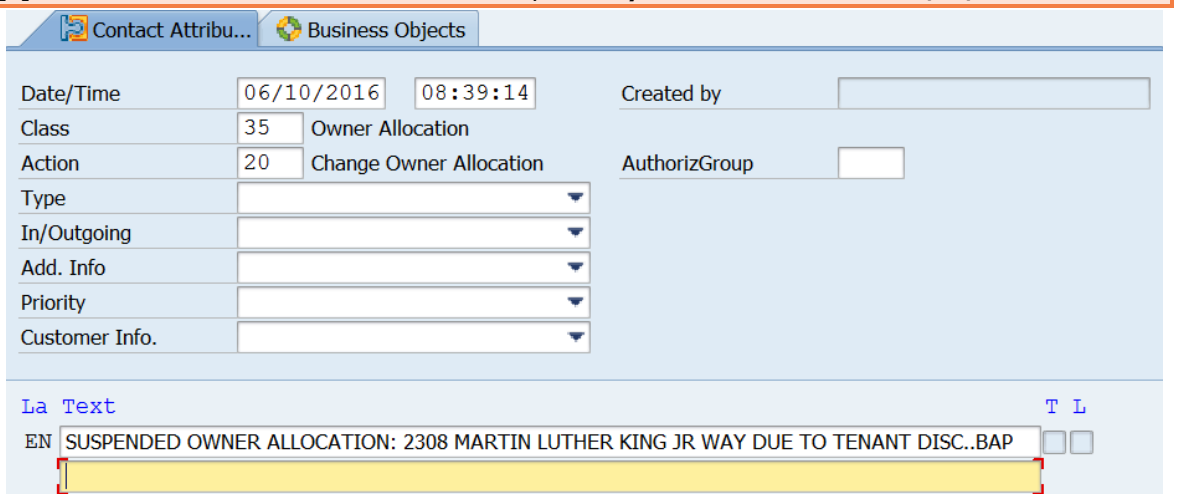
Uncheck the create event box that allows automatic owner move-in.



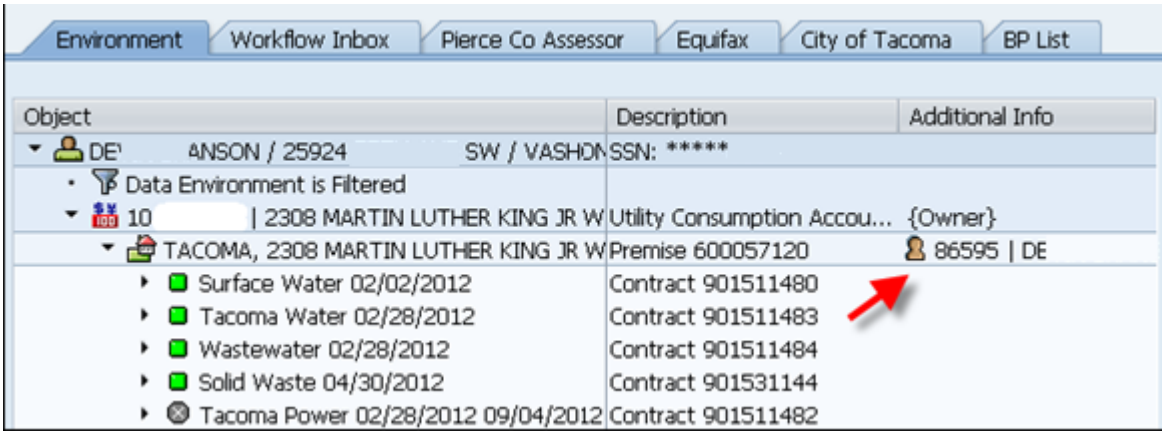
Click Save .

You will be prompted to add a contact note under class action 35/20, Owner Allocation Change. Once your note is added, save and the screen will return to the CIC0.

Page 8: [2] Deleted **Pinkerton, Beverley** **1/18/18 10:46:00 AM**



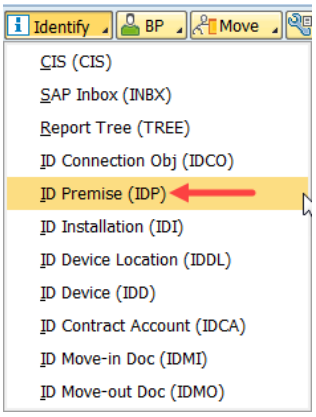
Under the Environment Tab in the Application Area, Click Refresh and the BP will be changed.



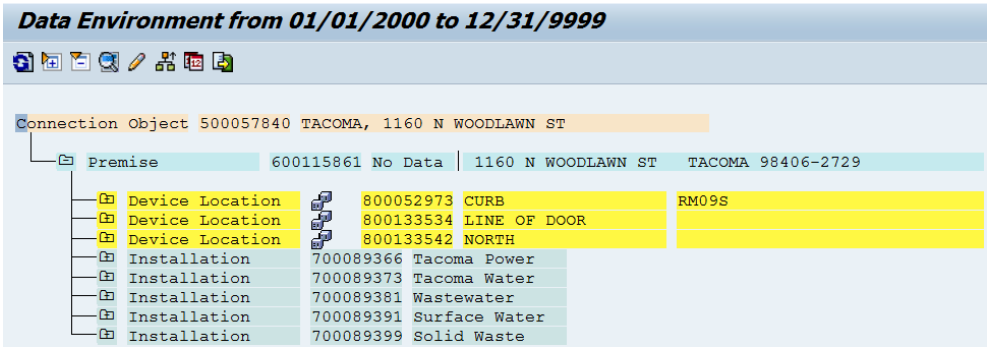
CSTSK-1106.1-CSR Moving In Service (Known BP)

When a known BP requests to establish service at a premise, the CSR:

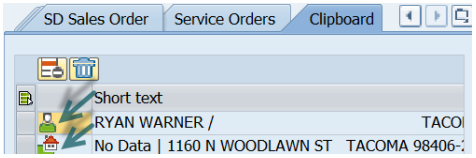
1. Identifies the BP and populates the CIC with the BP information.
2. Clicks on the 'Identify' button and selects 'ID Premise (IDP)' from the drop down menu.



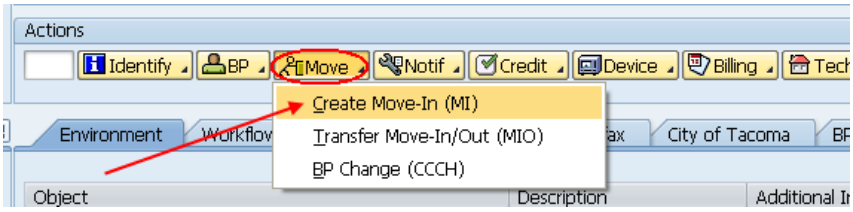
3. Identifies the premise. Refer to CSTSK-1106.3-CSR *Conducting a Premise Search*.



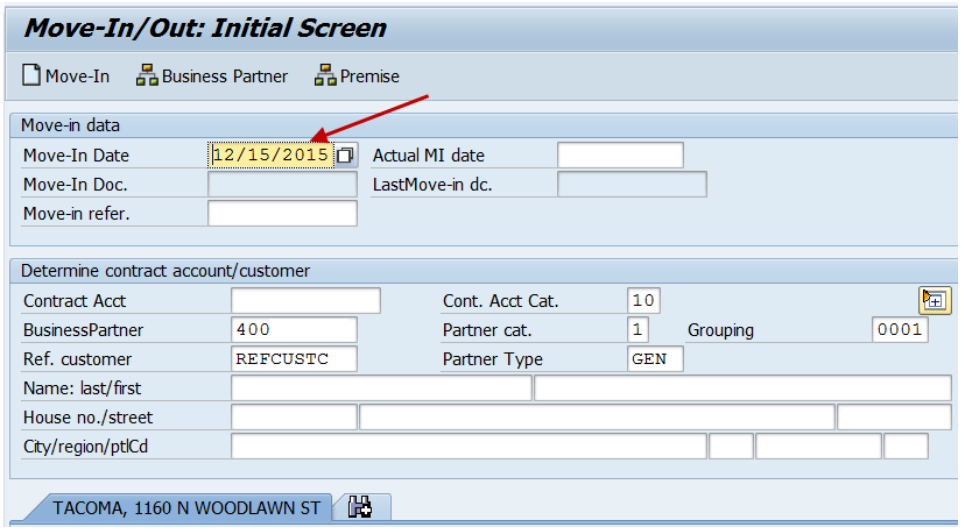
4. Clicks the green arrow back button.
5. Clicks the Clipboard tab in the Navigation section of the CIC and verifies the correct BP and Premise information are on the Clipboard.

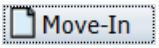


6. Clicks the 'Move' action button and selects 'Create Move-In (MI)' from the drop down menu.

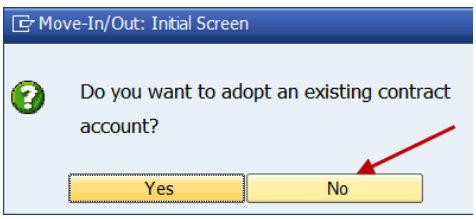


7. The date will default to the next business day. If the move-in date is different from the next day, changes the date before proceeding to the next step.



8. Clicks the 'Move-in' button. 

9. A pop-up message will appear, clicks 'No'.

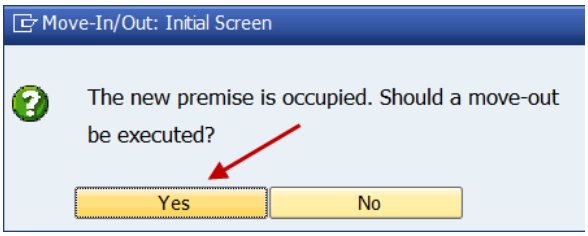


A pop-up screen will display with all the installations at the premise, the status of the installations (.. installation on or installation off), the current or previous BP name and move-in date, and whether the occupant is the owner or tenant.

In some cases it may be necessary to adopt the contract account (i.e. gap in surface water, rental light move in, irrigation move in, etc.)

10. Selects the installations by checking the box for each service to be moved in and clicks the green check.
Note: The following message will appear at the bottom of the screen if the standard address will not be modified due to the business partner having more than five contract accounts. BP Std. Address Not Adjusted - More Than 5 C/A

11. A pop-up screen will display. Clicks the 'Yes' button. This will move services out of the current customer's name.

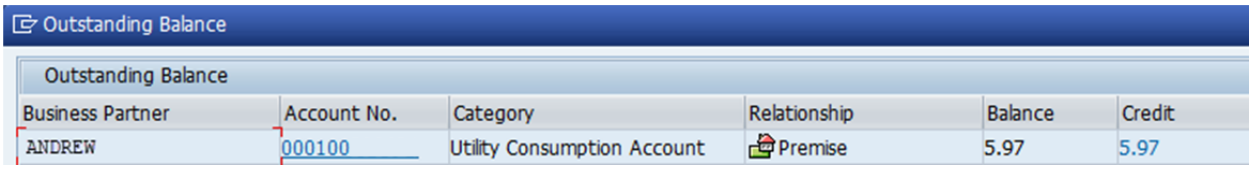


The following message will appear at the bottom of the screen:

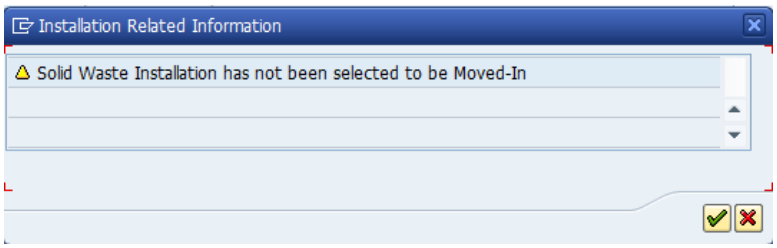
Move-out document 876226 has been created

12. A pop-up message may appear (see below). Reviews the message before proceeding to the next step.

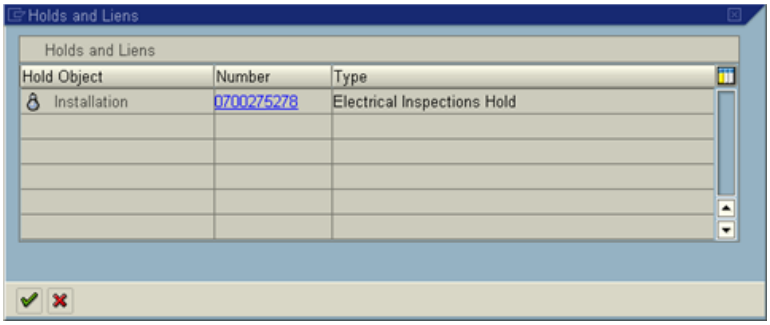
- Previous owner has an outstanding balance



- Some, but not all installations are moved in

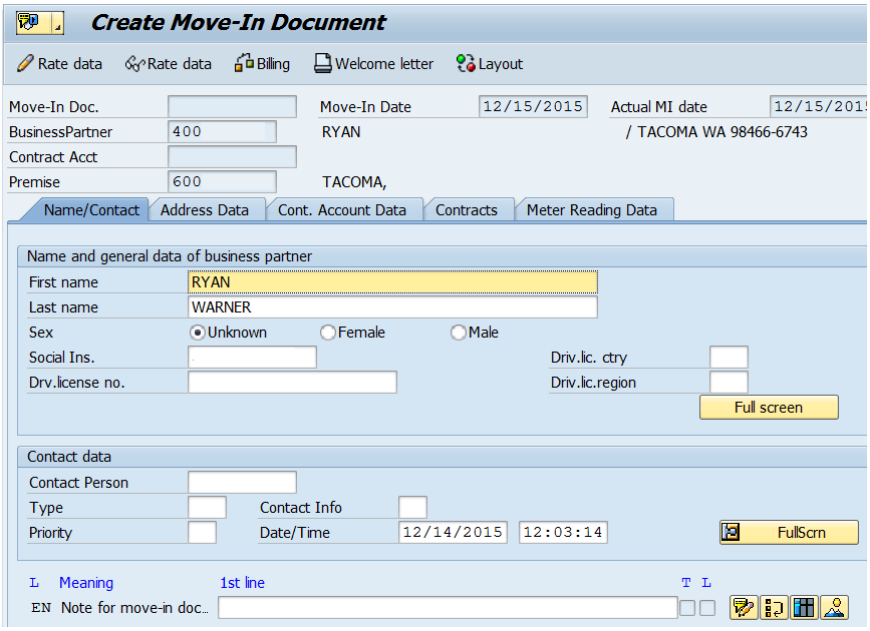


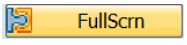
- There is a hold on the account



13. Once the pop-up message has been reviewed clicks the green check.

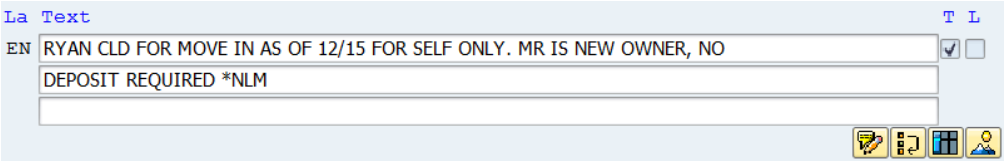
The known BP's information will populate in the fields.



14. Clicks the 'FullScrn' button. 

15. Creates a detailed contact note to include the following:

- Who initiated the move in and if it was a call or email
- Dates – when the request was received; and date of requested move in
- Tenant/owner names
- Deposit requirements – include reason waived or requested
- CSR initials

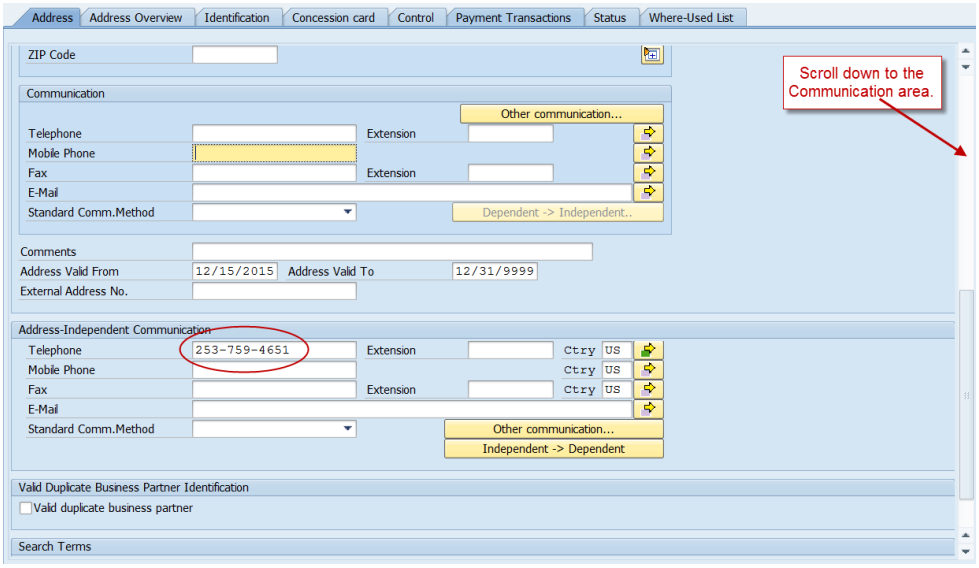


16. Clicks the green arrow back button.

17. Clicks the 'Address Data' tab.

    If the customer requests to add a different mailing address from the premise address, clicks on the 'Full screen' button Full screen in the 'Standard address of business partner' section. Refer to CSTSK-303.1-CSR *Adding/Changing a Mailing Address*.

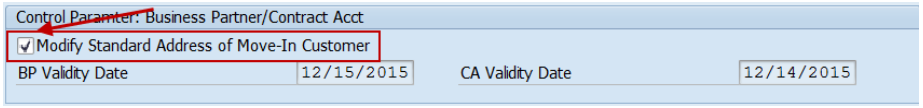
18. Clicks on the 'Full screen' button Full screen in the 'Communication data for business partner' section.



19. The BP's previous phone number will be populated. Makes any necessary changes. Enters the phone number with dashes, in both the 'Communication' and 'Address-Independent Communication' areas.

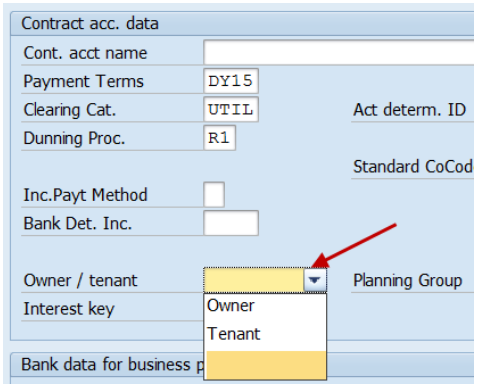
20. Clicks the green arrow back button.

21. In the 'Control Parameter: Business Partner/Contract Acct' area; the 'Modify Standard Address of Move-In Customer' box will be checked if the customer has less than five open or closed accounts. If the box is checked, it means that the new address will become the standard mailing address. The box should be unchecked if the BP already has an established mailing address, such as a PO Box that he wants to continue to use.

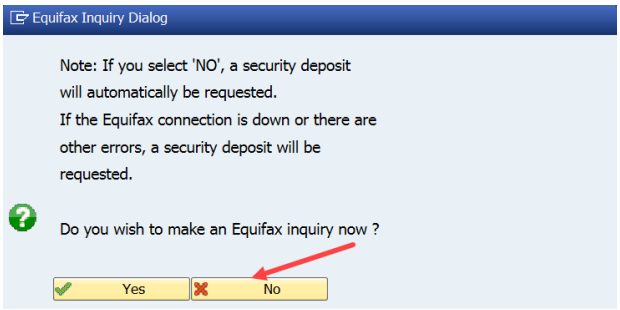


22. Clicks the 'Cont. Account Data' tab.

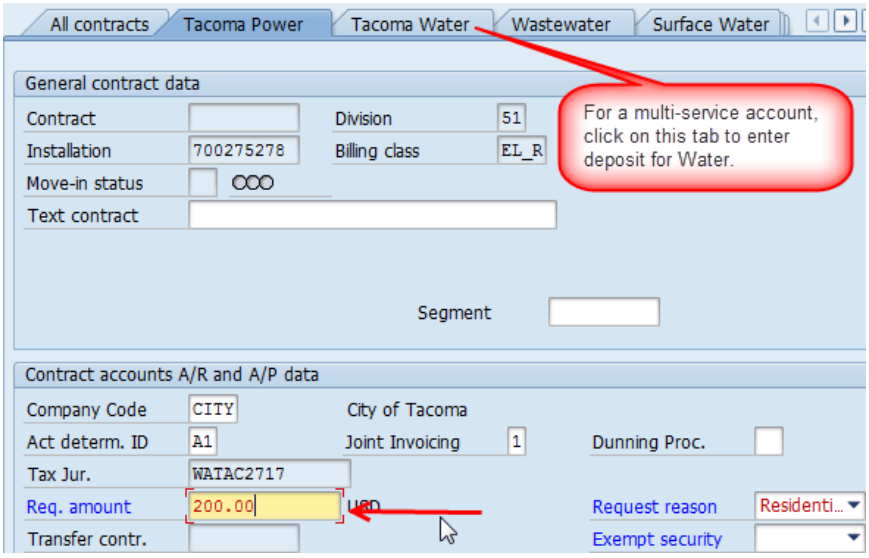
23. Identifies whether the party moving in is an owner or tenant.



24. Clicks the 'Contracts' tab. The following message will appear if Tenant was selected, click 'No':

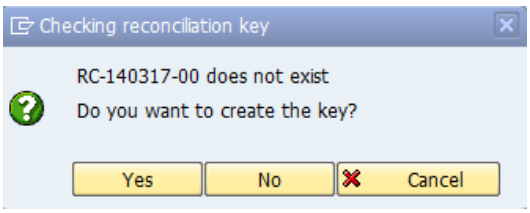


25. Enters deposit amounts by contract (power, water, etc.) if required. Refer to the Deposits and Waiver Options Fact Sheet or CSTSK-1118.1-CSR *Waiving Residential Deposits*.

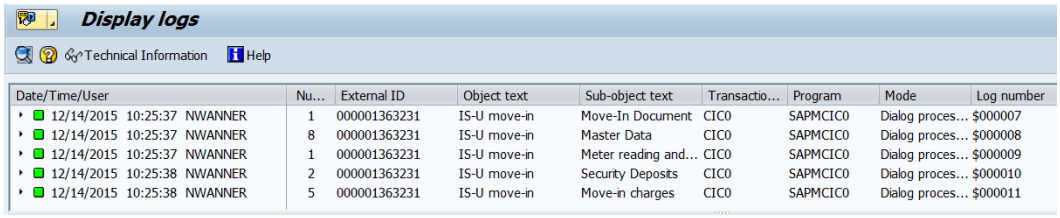


26. Clicks the Save button.

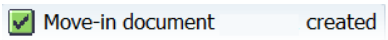
Note: If you are the first person in the City to do this transaction for that day, the following pop-up box will display. Click 'Yes'.



27. The 'Display Logs' screen will display. Clicks the green back arrow button.



The following message will appear at the bottom of the Notification Processing Screen



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28. Reviews the 'Notification Processing' screen.

- Checks the information in the 'Header Data' area to make sure the correct BP is being moved into the correct address.
- Verifies that the notification created is for the correct date and type of meter(s) installed at the service address.

a. If reconnecting service, discusses safety concerns with the customer. Include the following:

- If reconnecting water, explain all faucets (inside and outside) should be checked and confirmed in the off position.
- If reconnecting power, asks the customer if it is safe to reconnect the service by confirming the following:
    i. Oven and burners are turned off
    ii. The stove top is clear
    iii. Space heaters, if being used, are off and unplugged.

b. Explains the actions described are critical to prevent a fire and loss of property or life, especially in multi-dwelling scenarios.

- Explain to the customer it is always a good idea to use surge protectors and/or turn all electronic devises off or unplug them. The customer needs to be aware if there is a large power draw when attempting to reconnect the service, the power will not be reconnected "not present".
- For water restoration, let the customer know water will not be reconnected "not present" if there is an indication that there is an open fixture (faucet, spigot open, etc.).

  A return trip fee may be imposed for additional requests to reconnect service. A third request to reconnect water service will require the customer be "present" for the reconnection. Refer to CSTSK-1301.2-CSR *Second Reconnection Request with an Open Fixture*.

c. Asks the customer to acknowledge understanding of the safety concerns discussed.

- If the customer requests to be "present" for the reconnection, advises the customer of the following information:
    i. The customer must be present when the CFI arrives to reconnect the service. If the customer is not present the CFI will not reconnect service.
    ii. The reconnection will be scheduled as of the next business day and will be completed between 8:30 a.m. – 4:30 p.m.

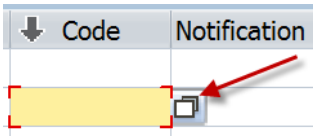
iii. If the customer is unable to be present between 8:30 a.m. and 4:30 p.m. an appointment may be offered between 8:30 am – 12:00 pm or 12:00 p.m. – 4:30 p.m.

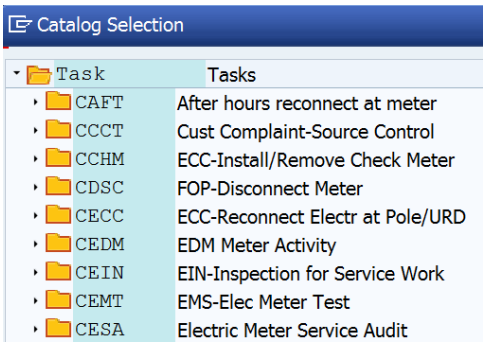
- Same day “present” reconnections must be called to the Dispatcher at x.8854 and be received by 3:30 p.m. (2:30 p.m. for Gravity areas) and will be completed by the end of the day.
- For all “present” reconnections, emails Field Operations so they order can be printed for the CFI.
- Skips to step e.

d. Explains to the customer that permission is needed for reconnections when the customer is “not present” and clearly ask for permission confirming precautionary measures are understood and that is safe to reconnect the power and/or water.

e. Enters the desired notification code and notification remarks.

Note: Notification types can be found by selecting the double paper once the cursor has been placed in the Code field.





Examples of notifications:

Code	Notification Remarks/Messages
CREC01	C/I NOT PRESENT IS SAFE

Code	Notification Remarks/Messages
CAFT01	C/I AFTER 5:00 NP IS SAFE

Code	Notification Remarks/Messages
CREC03	C/I NOW-4:30 NP IS SAFE

Code	Notification Remarks/Messages
CREC03	C/I 8:30-4:30 NP IS SAFE

Important: Include appropriate reconnect time frame information, as needed, for the reconnect (power or water). **C/I NOT PRESENT IS SAFE** must be part of the notification.

Code	Notification Remarks/Messages
CREC04	PRESENT C/I 8:30-4:30

Code	Notification Remarks/Messages
CREC04	PRESENT C/I 8:30-12:00

Code	Notification Remarks/Messages
CREC04	PRESENT C/I 12:00-4:30

If requesting reconnection of a power meter where service has been off for more than a year, include in the notification remarks whether the power has passed inspection.

Notif. Date	Code	Notification Remarks/Messages
06/17/2015	CREC03	PASSED INSPECTION
06/17/2015	CREC04	
06/17/2015		
06/17/2015		
06/17/2015		
06/17/2015		

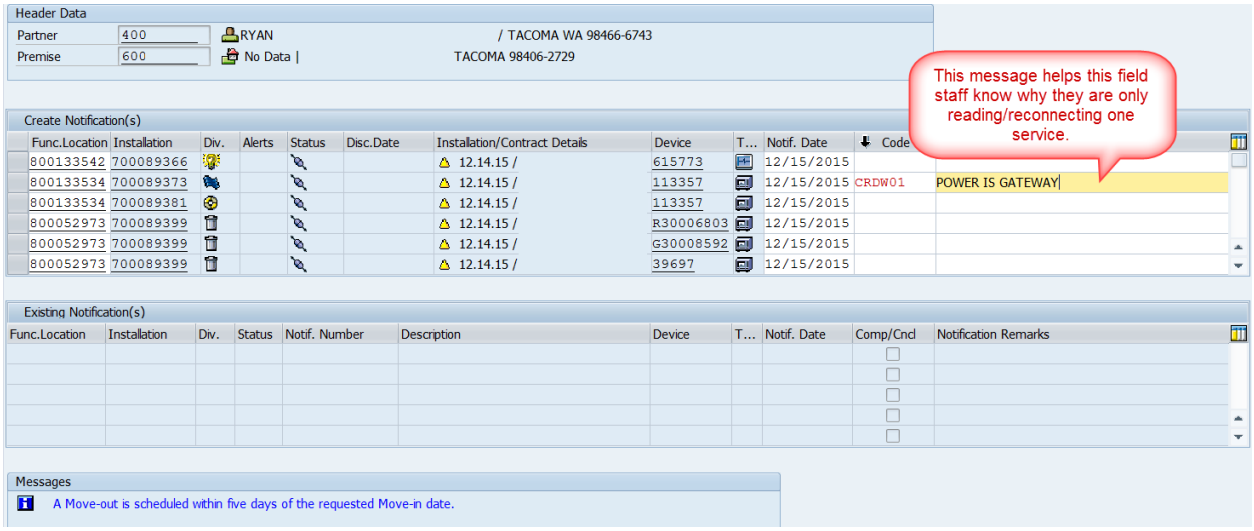
29. Selects ‘Create Notifications’.

The notification that was created will display under the ‘Existing Notification(s) section of the Notifications Processing Screen.

Existing Notification(s)

Func.Location	Installation	Div.	Status	Notif. Number	Description	Device	Ty...	Notif. Date
800146053	0700			040003224522	Dunning Reconnect- Electric	11		05/06/2016

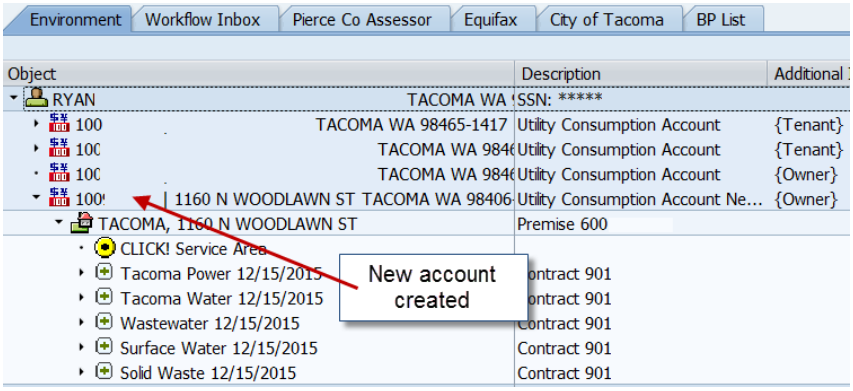
Note: For electric meters, make sure you request both the correct field activity (such as a read or reconnection) and that it is specific to the type of meter that is onsite, such as a High Tech (Gateway) meter.



30. Clicks the green arrow back button.

Important! If a cut-in notification was created for the same day, complete the SharePoint Cut-in Slip. **Do not send the SharePoint Cut-in Slip after 4:30 pm.** The notifications must be called in directly to Dispatch at 502-8854.

31. Clicks the refresh button. The CIC will now display the BP with new move-in. It may be necessary to view the BP as primary to view the new move-in.



32. Reviews other open accounts with the BP to verify if any other accounts should be moved out due to the new move in.

Reference: CSCSS-1106 Moving In Service

Revision History:

Created: 12/14/15

Revisions: Reformatted 3/7/17 with new icons by NLM; Made changes to the FI areas for reconnection times; added information regarding power service off over one year step 28e 5/2/17 by NLM; updated step 31 6/26/17 by NLM

TPU CS STANDARD

Approved by: SOP Vetting Committee

CSCSS-1106 Moving in Residential Service

This standard applies when a customer has requested to establish service within the TPU service area.

Note: Commercially-rated garage/shop accounts are considered residential for the purposes of this standard.

Customer Services defines a **delinquent balance** as unpaid charges that are dunning level one (DL1) or higher.

1. **Commercial accounts will be moved in by a Commercial SME.**
   Refer to *CSTSK-1112.1-CST Moving in Service for a Commercial Account*

2. **The premise must be identified before completing the move in.**
   - Check for holds, liens and other policy restrictions.
     - Electrical inspection hold, including meter shop holds
     - Power has been off over one year*
     - Public Works hold
     - Statutory and recorded utility liens
     - SCI or meter tampering charges
     - Water inspection hold (backflow, leak repair, etc.)

   *If the power has been off over one year, advises the customer that an application must be completed for the property to be inspected by Power. The application can be found online at mytpu.org, Application for Electrical Permit. The completed application can be returned via fax, email or mail to:

   Attention: Electrical Inspection 3628 S 35th St, Tacoma WA 98409
   Fax: 253-502-8659
   Email: powerei@cityoftacoma.org

   Customers can come into the lobby and fill out the application in person at Electrical Inspection. Once the application is received, a payment of

$40.00 can be made by phone: 253-502-8277, mailing a check, or paying at the Electrical Inspection counter.

The following information is required to be completed on the application:

- Site address
- Owner/Tenant Name, phone number, address
- Description of electrical work “service off over one year”
- Building use and type of building
- Signature and date

Applications and payments that are received by 1:00pm can be scheduled for inspection the following business day.

3. **The move in must be requested by an account holder, property manager or property owner.**

    - A request can be submitted via phone, MyAccount, Property Manager Website, or in person.
    - Email requests may be received for property owners that do not qualify for Property Manager Website access.

4. **A BP search will be completed to determine if the BP is known or unknown.**

5. **The CSR must verify applicant identity if the BP is unknown.**

6. **The CSR will identify the account holder as owner or tenant.**

7. **The CSR will check for outstanding and/or delinquent balances.**

    - All delinquent balances for the applicant/customer calling must be satisfied before services can be established **except** when TPU has been informed that the applicant/customer has filed chapter 7 bankruptcy.
    - If there is a balance from an owner and a new owner is requesting service, the CSR will verify that there is a valid escrow quote or the statutory utility lien (including any recorded liens) has been satisfied.

- If the owner's account is delinquent (over $50) and a tenant is requesting service, the owner's account must be brought current before the tenant can establish service.
- If the balance is from a tenant, the CSR will check for meter tampering charges that may need to be satisfied before the move in can be completed.
- If there is a *delinquent* balance from a current tenant we will not change the name on the account to another tenant who resided in the unit at the same time the charges were incurred until those charges are paid or a new tenant takes possession of the unit.
    - A lease agreement should be requested and only requested in clear cases of overlapping tenancy or when a Field team member identifies the same tenants.

8. **Surface water must be moved in with all other services.**
   Refer to *CSCSS-1113 Moving In Surface Water*.

9. **Solid Waste must be moved in separately from all other services when no containers are present.**

10. **The Customer Solutions Office will be notified when an account with LIE or BCAP is moved in. Refer to *CSTSK-2010.5-CSR Moving in or Moving Out Service on BCAP Accounts*.**

Reference:
CS Policies 2.2.4.6
CSTSK-1106.1-CSR Moving In Service (Known BP)
CSTSK-1106.2-CSR Moving In Service (Unknown BP)
CSTSK-1106.3-CSR Conducting a Premise Search
CSTSK-1106.4-CSR Reversing a Move In
CSTSK-1106.5-CSR Changing a Move In
CSTSK-1106.6-CSR Moving in Service During a Change in Ownership
CSTSK-1106.7-CSR Verifying Ownership via County Assessor
CSTSK-1112.1-CST Moving in Service for a Commercial Account
CSTSK-1801.5-CSR Managing Chapter 7 Bankruptcy Accounts
CSTSK-2010.5-CSR Moving in or Moving Out Service on BCAP Accounts

Revision History:

Created: 1/8/16; 10/17/2016 changed title to “Moving in Residential Service.”

Revisions: 12/7/17 Added #10; added electrical inspection info in step 2 2/20/18 by NLM; updated step 7 bullet 5 per JMH 5/18/18 by NLM;