



**City of Williams, Arizona**  
**Request for Proposals**  
**for Meter Replacement Project**

The City of Williams is inviting qualified companies to submit Proposals to undertake the Meter Replacement Project as outlined in the RFP issued November 3, 2014. This procurement is being conducted in accordance with the Williams City Code, Section 2-6.01.

The City intends to review all proposals and may at its sole discretion enter into a contract with the selected company. Only companies that have demonstrated experience and a proven history of providing the requested services will receive consideration.

Companies wishing to respond to the Request for Proposals for the Meter Replacement Project may obtain the complete information packet at the City of Williams 113 S. 1<sup>st</sup> Street, Williams, AZ 86046 or [www.williamaz.gov](http://www.williamaz.gov). Additional information may be obtained by contacting Kyle Christiansen, Public Works Director or Brandon Buchanan, City Manager at 928-635-4451.

All responses to the request for proposals should be directed to the following address:

Williams Public Works Director  
City of Williams  
113 S. 1<sup>st</sup> Street  
Williams, AZ 86046.

All responses to the request for proposals must be received by 1:00 pm January 16, 2015. Late responses to the request for qualifications will not be accepted.

**CITY OF WILLIAMS ARIZONA  
REQUEST FOR PROPOSALS  
Meter Replacement Project**

This is a Request for Proposals specifying services needed and lists the criteria upon which the Proposal responses will be evaluated. When received, Proposals will be reviewed and ranked in order, beginning with the one deemed most beneficial to the City. Negotiations concerning the final scope of work may be necessary with the selected Proposer to accommodate the available budget for this project.

**PURPOSE OF PROJECT**

The City of Williams, recognizing significant water loss resulting from antiquated metering technology, seeks to undertake the system-wide replacement of existing water meters with fixed network Automated Meter Infrastructure (AMI) technology (including meter setup (setter, box, valves, etc), meters, AMI network components, and integration with billing software) to approximately 1,500 existing customers. The current system contains a large variety of meters in respect to age, size, installation setup, and make. The purpose of this project is to replace the entire meter system with a “turn-key” uniform system of new, accurate Sensus iPerl (or equivalent) water meters. Please see Item #7 regarding procurement of materials.

**GENERAL CONDITIONS**

1. **INSTRUCTIONS TO PROPOSERS:** To insure consideration of your Proposal, please follow these instructions. One original and five (5) copies of all Proposal sheets must be executed and returned, unless otherwise directed. **Provide one Adobe pdf copy of the Proposal in its entirety on cd.** All Proposals not in compliance with the conditions specified herein are subject to rejection at the City’s discretion.

2. **PROPOSAL ENVELOPE:** All Proposals must be returned in a sealed box or envelope addressed to the City of Williams and should contain *on its face* the following information:

PROPOSAL FOR: City of Williams AMI Water Meter Replacement Project  
Name and address of Proposer  
Due: January 16, 2015 at 1:00 pm.

The address to send the Proposals is:

City of Williams – Public Works Director  
113 S 1<sup>st</sup> Street  
Williams, AZ 86046

3. **EXECUTION OF PROPOSAL:** The Proposal must contain the signature of an individual or of an authorized representative of the Contractor making the Proposal, in the space provided on the Proposal Form, if provided as a part of the Proposal package, or on Proposer's own form, if a specific Proposal form is not provided.

4. **PROPOSAL OPENING - LATE PROPOSALS:** Proposals will be opened publicly, the name of the Proposers read aloud and recorded, on the date and time indicated, at the location specified in this Request for Proposals. It is the Proposers' responsibility to make certain that his/her Proposal is in the hands of the Public Works Director prior to January 16, 2015 at 1:00 pm at Williams City Hall. Any Proposal received thereafter will be rejected and returned to the Proposer.

5. **CONSIDERATION OF PROPOSALS:** Telephonic, electronic, or faxed Proposals will not be considered. The Proposer agrees that his/her Proposal will not be withdrawn within ninety (90) calendar days following opening of the Proposals, and that during such time his Proposal will remain firm and irrevocable. The City of Williams reserves the right to reject any or all Proposals, and to waive any technical defects in Proposals.

6. **AWARD:** The award will be made to the Contractor most qualified and offering the best value to the City of Williams, which will be determined by evaluation of Proposals using the evaluation criteria contained in the RFP, and in accordance with applicable rules and regulations governing the purchase and contract adopted and established by the City and the State of Arizona.

7. **SPECIAL NOTE REGARDING PROCUREMENT OF MATERIALS:** The Contractor will provide a list of necessary METERS AND AMI/AMR equipment and quantities needed to the City. Said list shall contain estimated cost for materials. The City will then procure the said materials via State Contract and provide said materials to the Contractor. Additional secondary materials such as setters, boxes, etc. will be procured by the Contractor at the time they become necessary and billed separately to the City.

8. **NON-COLLUSION:** By submitting a Proposal in response to the request and signing the Anti-Collusion Statement form enclosed, the Proposer represents that, should the Proposal be accepted, the resulting contract(s) would not violate any provisions of federal law or regulations, or any ordinances or regulations established by the City of Williams. The Proposer warrants as an integral and essential part of his/her Proposal: (a) that he/she has not participated in nor is he/she obligated or bound by any agreement, arrangement or other understanding with any person, firm or corporation with respect to the allocation of the business afforded by or resulting from the acceptance of his/her Proposal; (b) that his/her Proposal is or is intended to be competitive and free from any collusion with any person, firm or corporation; and (c) that he/she is not a party to nor has participated in nor is he/she obligated or otherwise bound by any agreement, arrangement or other understanding with any person, firm or corporation relating to the exchange of information concerning Proposals, prices, terms

or conditions upon which the contract(s) resulting from this acceptance is to be performed.

9. **PERMITS, ETC.:** All Proposals submitted shall include in the price the cost of any business or professional licenses, permits or fees required by the City and any agency having jurisdiction over the services solicited through this Request for Proposal.

10. **PATENT INFRINGEMENT, ETC:** By submission of a Proposal the Proposer certifies that the services to be furnished will not infringe any valid patent, copyright, or trademark and the successful Proposer shall, at his/her own expense, defend any and all actions or suits charging such infringement and hold the City of Williams harmless in case of any such infringements.

11. **TAXES:** All Proposals shall be inclusive of Arizona taxes.

12. **PERFORMANCE:** During the performance of the contract, the Proposer agrees as follows:

- a. The Proposer will not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin.
- b. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirement of this section.
- c. The Proposer will abide by the all of requirements of the Davis Bacon Act.
- d. The Proposer will abide by all of the requirements of the American Iron & Steel under HR 3547.

13. **EVALUATION CRITERIA:** The weighted evaluation criteria in the Scope of Work will be used to evaluate Proposals.

14. **REJECTION OF PROPOSALS:** The City of Williams reserves the right to reject any or all Proposals in whole or in part and to award by items, parts of items, or by any aggregate group of items specified. The City also reserves the right to waive technical defect when in its judgment the best interests of the City thereby will be served.

15. **QUALIFYING PROPOSERS:** Prior to awarding of Proposal, the City of Williams may require submission by Proposer of complete financial statement and questionnaire describing Proposer's financial ability and experience in performance of similar work.

16. **RULES AND REGULATIONS:** All work performed under this agreement shall be in strict compliance with local, State and Federal laws, rules and regulations. Proposer shall assume all liability for fines and penalties assessed by the authorities for any infractions.

17. **MINORITY AND WOMEN WORK FORCE PARTICIPATION:** The City of Williams abides by the established policy of: 1) promoting Minority and Women-Owned Business Enterprise participation in business contracts and 2) requiring Proposers doing business

with the City to use good faith efforts to promote cultural diversity and minority participation in the work force, including managerial positions. Proposers must provide information as part of the Proposal acknowledging its understanding and willingness to comply with DBE Requirements.

**18. DAVIS BACON WAGES AND AMERICAN IRON & STEEL PROVISION:** This contract is subject to Davis Bacon and American Iron & Steel Provisions as outlined in #12 above and Exhibit B. Note: Wage Decision is subject to change-please ensure you have most current wage decision prior to submitting proposal.

**19. COSTS:** The City of Williams bears no responsibility for any costs incurred in the preparation of the Proposal.

**20. PROHIBITION OF LOBBYING.** Except for negotiations authorized by the City of Williams, or other state or federal law, lobbying by the proposer, or the proposer's principals, officers, employees, attorneys, or other agents, is strictly prohibited during the Proposal Period. Lobbying in violation of this section may cause the proposal to be rejected. "Lobbying" means influencing or attempting to influence action or non-action in connection with this RFP or the proposal, through direct or indirect oral or written communication with the City of Williams staff and elected officials or any member of a City appointed Board. The following activities are not within the definition of "lobbying," and are permitted: requests for clarification submitted in accordance with this RFP, discussions with the City Selection Committee as part of the selection process, the submission of additional information in response to a request by the City, and addressing the City Council during the City Council meeting at which the contract is awarded or all proposals are rejected. The Proposal Period begins on the date that this RFP is issued and ends when the contract is awarded or all proposals are rejected.

**21. SELECTION PROCESS:** For the purpose of selecting the most qualified Contractor, the City of Williams will use a competitive selection process as set forth in pertinent City and State procurement requirements. The procedure will involve the following steps:

a. The City will advertise and mail formal Requests For Proposals to interested Proposers.

b. The City Selection Committee will review, rank, and shortlist all Proposals received by January 16, 2015 at 1:00pm. Oral presentations by the short-listed Proposers to clarify their Proposals may be required. These presentations will serve to explain implementation techniques integral to their written Proposal. Subsequent to the receipt of Proposals, the City may schedule a time for each requested oral presentation.

c. The City's Selection Committee will then rank each Proposal and prepare a recommendation for approval. Upon City approval, the City Manager shall negotiate a contract with the selected Contractor. Should the City Manager be unable to negotiate a satisfactory contract with the Contractor considered to be most qualified, the City Manager, or designee, shall terminate such negotiations with that Contractor and begin

negotiations with the next most qualified Contractor and so on until negotiations are deemed successful by the City.

d. The City of Williams with the approval of the Water Infrastructure Finance Authority (WIFA) has the sole authority to bind the City to the terms and conditions of a contract that has been approved by the City Council, executed by the City Manager, and approved by the City Attorney. The City reserves the right to modify or reject any contract for the acquisition of goods and/or services submitted to it for consideration.

## **AMI Water Meter Replacement Project Request for Proposals**

The City of Williams hereby requests proposals and pricing from contractors experienced in and capable of implementing the system-wide replacement of existing water meters with fixed network Automated Meter Infrastructure (AMI) technology (including meter setup (setter, box, valves, etc), meters, AMI network components, and integration with billing software) to approximately 1,500 existing customers. The current system contains a large variety of meters in respect to age, size, installation setup, and make. The purpose of this project is to replace the entire meter system with a “turn-key” uniform system of new, accurate water meters. **Based on current conditions, work may include extensive modifications to meter setups to accommodate the new AMI fixed network. As a result, all contractors should conduct a comprehensive survey of existing field conditions prior to submission of proposals to ensure their proposal will accurately reflect the work required to complete the project.**

The City recognizes that a qualified water meter replacement contractor can efficiently expedite this system-wide deployment and, based upon the multiple components that must be installed, configured, commissioned, and programmed, the City intends to award one contract to one entity (“Contractor”) that will be responsible for every aspect of this deployment (see note below regarding procurement of materials).

**SPECIAL NOTE REGARDING PROCUREMENT OF MATERIALS:** The Contractor will provide a list of necessary METERS AND AMI/AMR equipment and quantities needed to the City. Said list shall contain estimated cost for materials. The City will then procure the said materials via State Contract and provide said materials to the Contractor. Additional secondary materials such as setters, boxes, etc. will be procured by the Contractor at the time they become necessary and billed separately to the City.

Each proposal must be accompanied by a form of proposal security in an amount not less than ten percent (10%) of the Price Proposal amount as shown on the Price Proposal Form. Once all proposals have been evaluated, the City will return the security provided to all respondents except for the top three (3) ranked Contractors. Proposers, at their option, may furnish such security in the form of a money order, cashier's check, certified check, U.S. Currency, U.S. Government bonds or notes at par value or proposal bond written by a surety company, approved by the City Manager and authorized to do business in the State of Arizona.

If a proposal bond is provided, the surety company executing the bond must be authorized to do business in the State of Arizona. If the proposal bond is in an amount greater than \$5,000.00 the surety company executing the bond is listed by the United States Treasury Department as being approved for writing bonds for federal projects on its current list in an amount not less than the required bond amount. If a proposal bond is provided it must be in a form approved or provided by the City Manager and must be accompanied by sufficient evidence of the authority of the issuing agent.

The City will require the Contractor to enter into a written contract. The contract will require the contractor to indemnify the City and insure for various risks associated with the work. In addition, contract will require the contractor to provide the City payment and performance bonds or other forms of acceptable security to ensure payment to subcontractors and suppliers and the contractor's faithful performance of its obligations. Generally the City requires such security in an amount equal the contract price. For this contract the City is likely to require an increased amount for the performance bond or security based on the potential risk of substantial losses to the pre-purchased radio read water meters, City's public infrastructure and utility operations that may be associated with the work. For this purpose the proposer is required to provide with the Proposal, evidence that that the proposer has a bonding capacity of at least \$5,000,000. In negotiating the contract with the successful proposer the City may accept a reduction in the performance bond below \$5,000,000, if alternative terms are reached that minimize or adequately protect the City with regard to these risks. The surety company executing the bonds must be authorized to do business in the State of Arizona, and must be listed by the United States Treasury Department as being approved for writing bonds for federal projects on its current list in an amount not less than the required bond amount. The form of the bond must be approved by the City and must be accompanied by sufficient evidence of the authority of the issuing agent.

Proposals will only be considered from respondents who meet or exceed the minimum criteria listed below. Proposals that fail to meet these minimum requirements will be deemed by the City to be non-responsive and will not receive further consideration.

Contractor must possess an overall bonding capacity of at least \$5,000,000 (five million dollars). Certification of bonding capacity must be documented by a statement on company letterhead by the surety, notarized and signed by the Attorney in Fact.

### **I. Submittal Requirements**

The recommended maximum length of proposals is 20 single-sided pages, including graphics, charts, schedules and any other associated material, but excluding resumes and required documents. Resumes should be limited to key individuals and staff directly involved in the implementation of the project and should not include those officers or managers expected to have limited or no participation or role in the conversion.

Emphasis is being placed on performance capability to ensure the conversion will meet the AMI demands of the City. Because of the high investment cost of the Master Meter AMI system, the City requires proposers to ensure their performance will meet these expectations. Proposers should be careful not to sacrifice performance to ensure a low cost proposal, as pricing is only one of many factors under consideration.

## **II. Evaluation Criteria and Submittal Requirements**

### **Section 1 .Executive Summary**

Weight = 10

- A. Provide a brief overview of your Contractor's experience with similar AMI conversion projects and why your Contractor is best suited to serve City's system-wide deployment of Master Meter AMI technology. Contractor must have successfully performed AMI conversions for a minimum of three (3) years under their current business entity name.
- B. Contractor must disclose and certify any AMI installation-related litigation, contract noncompliance, or contract non-performance activities involving all prior clients within the past five (5) years.

### **Section 2 - Corporate Overview and Project Team**

Weight = 20

Provide general information on your Company, key employees that will be assigned to this project, and similar background information for any subcontractor(s) that your Company intends to utilize. Provide a list of references in support of RFP criteria requirements, including full contact information and contact persons. Provide a project organization chart listing titles and names of staff proposed for this project. Key personnel must have been actively involved in the development, management, and implementation of at least five (5) AMI conversion projects. The City will provide additional consideration for demonstrated prior experience installing the Master Meter AMI system. Key personnel must have been actively involved in the development, management, and implementation of at least (5) AMI conversion projects of 1,500 meters or more.

### **Section 3 .Project Management and I.T. Data Management Plan**

Weight = 30

Provide a detailed overview of how your Company intends to manage this project, including ongoing communication with the City, progress reporting, public relations, problem resolution, quality assurance, and overall system commissioning. A deployment timeline and project schedule must be included. In addition, your response to this section should address how your Company will accomplish the electronic integration of meter change-out data between the City Computer System Billing System and your Company's electronic meter data management system. This section shall include details and full reference contact information for at least (3) three AMI conversion projects of 1,500 meters, or more. Key personnel must have been actively involved in the electronic upload/download of mass meter change-out data with at least three (3) AMI conversion projects. Identify software systems for data collection, post processing, filtering and editing positional data, including version.

### **Section 4 .Local Hiring**

Weight = 10

The City requests use of the local workforce where possible and practical. Provide the Contractor's local hiring plan.

## Section 5 .Proposal Cost

Weight = 30

The Price Proposal Form provided shall be fully completed for all items listed. Unit prices must be all-inclusive of labor, materials, equipment, overhead/profit, and all other associated costs for the item. Prices quoted must be firm for a period of ninety (90) days from the Proposal due date to allow sufficient time for examination of Proposals, negotiations, and awarding of the contract. The City reserves the right to negotiate all pricing with the successful Contractor and to eliminate any proposal cost item(s) that is cost prohibitive to this project.

### **III. Scope of Work**

A. The CITY will purchase the “Primary Equipment”, defined as Radio Read AMI Water Meters and Fixed Network Hardware with Software. The Contractor will be responsible for handling and inventory of all Primary Equipment. Primary Equipment will be received and stored at a secured facility provided by the contractor. The contractor may stage at City designated properties with contractor provided acceptable, secured and lockable steel storage containers for storing the water meters and primary equipment.

The Contractor will be responsible for purchasing and providing all equipment other than the Primary Equipment (hereinafter “Secondary Equipment”), such as miscellaneous fittings, pipes, valves, turf grass/sod, landscaping and other necessary construction/paving materials, etc., required for a fully functional system. The Contractor will be responsible for storing and securing the Secondary Equipment. Certain City property is available for the contractors use in storing the Secondary Equipment. Compliance with standard City Standard Details and Materials Specifications is required and these documents are available electronically upon request.

B. The Contractor is responsible for obtaining all necessary permits as may be required by the City, County or State.

C. Contractor is responsible for verifying all meter installation needs with regard for any fittings needed to install new meter versus the existing meter.

D. The project must be completed within two hundred and forty (210) calendar days of the City’s Notice to Proceed and receipt of sufficient quantities of Primary Equipment to begin work. Additionally, the Contractor must warranty its labor, materials, and installation for a minimum period of twelve (12) months following completion as evidenced by final project approval by the City.

E. The Contractor will coordinate with City staff to obtain an electronic download of all utility billing data to import into the Contractor’s electronic meter data management system. The City currently utilizes utility billing software and it is the Contractor’s responsibility to ensure accuracy of all data electronically imported/exported throughout the duration of the project so as not to disrupt the City’s existing meter reading and billing processes in any way. The software technology must be supported by its

manufacturer for at least the next 10 years. Such guarantee shall be provided by the supplier of said software technology.

For each meter location where the meter is to be replaced, the Contractor shall electronically capture the following:

1. Address/Service Location
2. Photographs:
  - a. Existing condition of meter box surroundings.
  - b. Existing condition of facility being served with meter box in foreground.
  - c. Existing condition of closed meter box.
  - d. Existing condition of open meter box.
  - e. Replaced meter condition of closed meter box.
  - f. Replaced meter condition of open meter box.
3. Previous meter reading (along with a digital photograph of the meter)
4. Install date
5. Meter size
6. Current meter reading
7. Previous meter and register serial numbers
8. New meter and AMI register serial numbers
9. New AMI transmitter serial numbers
10. Meter GPS Coordinates

This data will then be delivered to the City in an acceptable electronic format suitable for mass upload into the City's billing system. Electronic uploads will take place two (2) times per week and coordinated with the City's staff. In addition to the twice weekly work completed acceptable electronic file provided to City, contractor will provide a completed meter route to the City within 24 hours of completed installation of a full route.

F. All meters removed by the Contractor will be stored and disposed of by the Contractor. All removed meter test result(s) shall be provided to the City. **Any credit towards the City for the salvage value of said components should be noted in the proposal.**

G. The City combined with the Contractor will be responsible for mass media publicity and general notices to customers (e.g. bill stuffers). The Contractor will be responsible for shutting off the water to each meter service as well as notifying each customer of the

shut off. The Contractors' team will knock on the doors of residential customer's as well as leave notifications on their doors. In the case of commercial customer's (business, schools, hospitals, industrial, etc.) special efforts will be made to ensure minimum disruption to their water needs, which may necessitate that the meter replacement be conducted during non-business hours and weekends. The City shall approve in writing the text of all door hangers, notices and other written communications with customers. The Contractor will maintain a local office and local telephone number to assist customers with their concerns or to schedule locations for after-hours work.

H. The Contractor shall propose detailed scheduling and installation procedures to the City for approval prior to scheduling or commencing installations. The procedures shall be designed to optimize the work of the field personnel and all other staff working on the project, and reduce impacts on customers.

I. The City must be given online access to the Contractor's project management software in order to interactively track installation productivity, number of meters installed per day, substantial completion by route, anticipated completion date by route, and other key performance indicators. If online access is unavailable, a weekly report containing said information shall be provided to City Manager.

J. The Contractor shall assign qualified and responsible employees to each aspect of the requested work. All employees shall be presentable and act professionally during the course of the project. All employees shall wear a uniform that identifies the Contractor by name, as well as a prominently displayed photo identification badge. All employees shall be issued and carry a letter describing the project and work to be performed. A complete list of all employees and their duties must be submitted prior to beginning work.

K. The Contractor shall operate/maintain all vehicles and equipment in a legal, safe, and responsible manner and have the Contractor name, logo and contact information prominently displayed.

L. Before, or at the time of installation, the Contractor shall inspect the existing water meter setting, including piping, meter pit and shut-off valves. If the Contractor determines that conditions do not meet the required specifications or they are such that damage to the existing setup would result, the project manager shall so inform the City, not attempt the installation until the site is inspected by an authorized City representative, and postpone installation at that site until the City authorizes the Contractor to proceed with the work. The Contractor shall provide acceptable advance notice to property owners prior to any activity that will interrupt water service.

M. The Contractor is responsible for any damage to City owned or privately owned property that occurs at either side of the meter resulting from its installation efforts. Any damage incurred will be promptly repaired at the Contractor's expense. In addition, and only with prior notice to the City, the Contractor is not liable for any preexisting conditions such as leaks, faulty workmanship from previous projects, or faulty existing

materials. The Contractor shall photograph the area surrounding the meter prior to commencing work to document existing conditions.

N. The Contractor shall be responsible for replacing any meter, AMI unit, or appurtenances improperly set by its employees. The Contractor shall correct any damage to couplings, threads, unions, or meters by use of improper tools or cross threading by an employee. The Contractor shall be responsible for correcting any leaks at the valves, couplings, or service lines that could be reasonably attributed to the meter installation if reported by the City or its customers within the warranty period.

O. The Contractor is responsible for repairing any damage it causes to meter boxes and/or vaults that result from its installation efforts. Some areas of concrete, asphalt or other paved surfaces may need to be removed in order to gain access to meters. In this case, the Contractor will restore the affected area to a condition as close as possible to the condition as it existed prior to installation and in conformance with standard City specifications.

P. The Contractor shall replace all damaged, inadequate, or undersized meter boxes encountered with new meter boxes.

Q. Should the Contractor receive a call or complaint from a customer or the City regarding installation, the Contractor shall immediately log the call, including caller's name, address, account number if available, date, and time of call, nature of problem, and the action taken. Copies of all logs shall be forwarded to the City not less than bi-weekly. The Contractor must plainly identify the proposed mapping accuracy and GPS survey instruments they intend to use, including manufacturer, model, and year, for collecting coordinate and observation data for this project.

R. The contractor shall notify the City if it discovers or suspects an address or structure believed to be connected to the water distribution system is not currently equipped with a water meter. Upon consultation with the City, installation of a new service for said property shall be performed by the contractor. Unexpected costs in such cases shall be above and beyond the scope of this RFP, but will be paid at the same rates as provided in this project.

#### **IV. Existing Meter Inventory (Approximate)**

##### **Meter Size Quantity**

3/4"	1,284
1"	64
1-1/2"	4
2"	34
3"	6
4"	3
6"	1

**NOTE:** Existing meter inventory counts are based upon best available active and inactive utility billing record data and may differ from actual system totals. **Final**

**compensation shall be based upon the actual number of meters replaced and/or work completed.**

**V. Specifications: See Exhibit A for Typical Install/Equipment Specifications. City desires equipment to be Sensus iPERL or “equivalent” (as determined by City).**

## Exhibit A

# iPERL™ Water Management System

## Electromagnetic Flow Measurement System

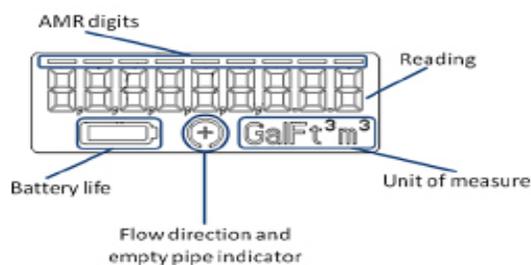
## Description

5/8" (DN 15mm), 3/4" (DN 20mm) and 1" (DN 25mm) Sizes

With no moving parts, the Sensus iPERL water management system is based on innovative electromagnetic flow measurement technology. The iPERL system family has an operating range as low as 0.03 gpm (0.007 m<sup>3</sup>/hr) to 55 gpm.



Electronic Register LCD Display



## Features

### CONFORMANCE TO STANDARDS

The iPERL system far exceeds the most recent revision of ANSI/AWWA Standard C-700 and C-710 for accuracy and pressure loss requirements. All iPERL systems are NSF/ANSI Standard 61 Annex F and G compliant and tested to AWWA standards.

### PERFORMANCE

The patented measurement technology of the iPERL system allows enhanced accuracy ranges at both low and high flows and perpetual accuracy over the life of the product and can be installed horizontally, vertically or diagonally.

### CONSTRUCTION

The iPERL system is an integrated unit that incorporates an electronic register and measuring device encased in an external housing. The measuring device is comprised of a composite alloy flowtube with externally-threaded spud ends. Embedded in the flowtube are

magnetic flow sensors. The all electronic, programmable register is hermetically sealed with a tempered glass cover. The iPERL system has a 20 year life cycle, along with a 20 year battery life guarantee.

### ELECTRONIC REGISTER

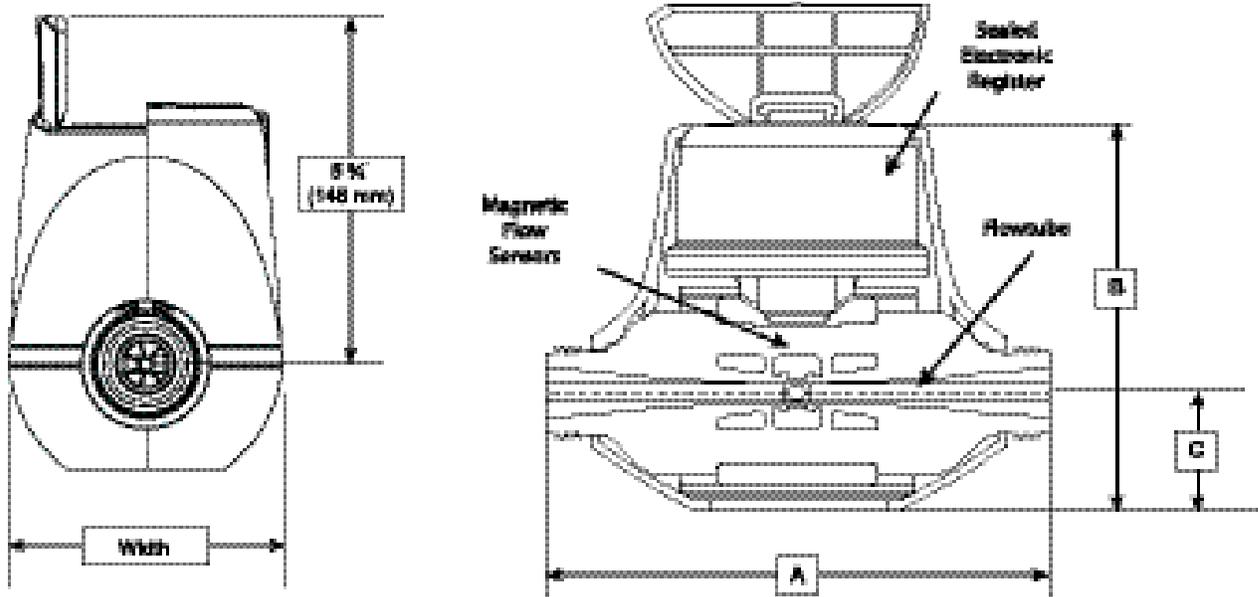
The high resolution 9-digit hermetically sealed electronic register with LCD display was designed to eliminate dirt, lens fogging issues and moisture contamination in pit settings with built in tamper protection. The tempered glass register cover displays readings with the AMR digits highlighted. Direction of flow and units of measure are also easily readable on the register display. The iPERL register features; AMR resolution and unit of measure that are fully programmable, integral customer data logging compatible with UniPro software tools. The large, easy to read display also includes battery life, empty pipe and forward/reverse flow indicators.

### TAMPERPROOF FEATURES

The integrated construction of the iPERL system prevents removal of the register to obtain free water. The magnetic tamper and low field alarms will both indicate any attempt to tamper with the magnetic field of the iPERL system.

### AMR / AMI SYSTEMS

iPERL systems are compatible with current Sensus AMR/AMI systems.



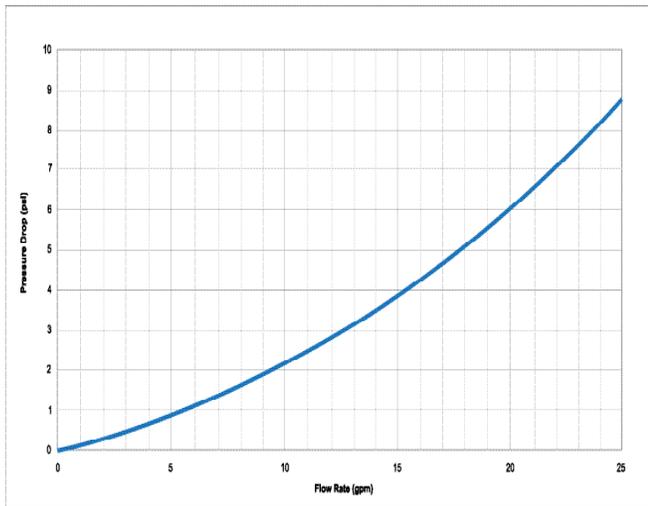
### DIMENSIONS AND NET WEIGHTS

Size	A (lay length)	B	C	Spud Ends	NPSM Thread Size	Width	Net Weight
5/8" (DN 15 mm)	7-1/2" (190 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	5/8" (15 mm)	3/4" (19 mm)	4-1/2" (114 mm)	3.1 lb. (1.4 kg)
3/4"S (5/8" x 3/4") (DN 20 mm)	7-1/2" (190 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	3/4" (20 mm)	1" (25 mm)	4-1/2" (114 mm)	3.1 lb. (1.4 kg)
3/4" (DN 20 mm)	9" (229 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	3/4" (20 mm)	1" (25 mm)	4-1/2" (114 mm)	3.2 lb. (1.5 kg)
1" (DN 25 mm)	10-3/4" (273 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	1" (25 mm)	1-1/4" (32 mm)	4-1/2" (114 mm)	3.3 lb. (1.6 kg)

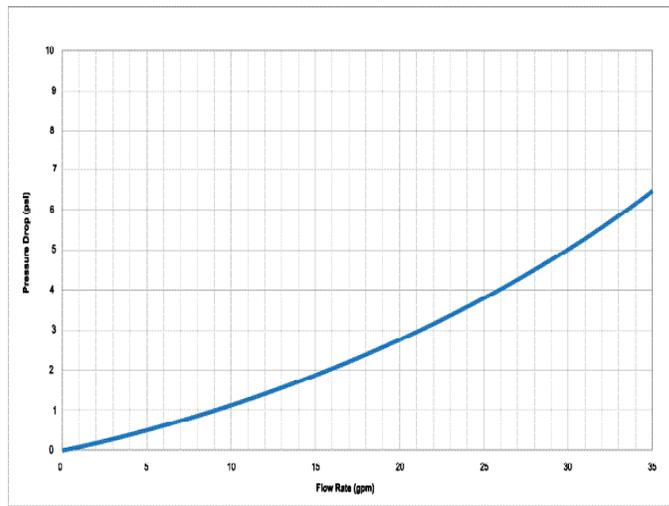
### SPECIFICATIONS

<b>SERVICE</b>	Measurement of potable and reclaim water. Operating temperature range of 33 °F (0.56 °C) - 150 °F (65.6 °C)	<b>MEASUREMENT TECHNOLOGY</b>	Solid state electromagnetic flow
<b>NORMAL OPERATING FLOW RANGE</b> (±1.5%)	5/8" (DN 15mm) size: 0.18 to 25 gpm (0.04 to 5.7 m³/hr) 3/4" (DN 20mm) size: 0.18 to 35 gpm (0.04 to 8.0 m³/hr) 1" (DN 25mm) size: 0.4 to 55 gpm (0.09 to 12.5 m³/hr)	<b>REGISTER</b>	Hermetically sealed, 9-digit programmable electronic register AMR/AMI compatible iPERL system register programmable using the UniPro programming package
<b>LOW FLOW RANGE</b> (±3%)	5/8" (DN 15mm) size: >0.11 gpm (0.025 m³/hr) to <0.18 gpm (0.041 m³/hr) 3/4" (DN 20mm) size: >0.11 gpm (0.025 m³/hr) to <0.18 gpm (0.041 m³/hr) 1" (DN 25mm) size: >0.3 gpm (0.068 m³/hr) to <0.4 gpm (0.09 m³/hr)	<b>MATERIALS</b>	External housing – Thermal plastic Flowtube – Polyphenylene sulfide alloy Electrode – Silver/silver chloride Register cover – Tempered glass
<b>STARTING FLOW</b>	5/8" (DN 15mm) size: 0.03 gpm (0.007 m³/h) 3/4" (DN 20mm) size: 0.03 gpm (0.007 m³/h) 1" (DN 25mm) size: 0.11 gpm (0.025 m³/h)	<b>ALARM DEFAULTS</b>	Alarm Duration – 90 days Leak Duration – 24 hours Datalog Interval – 1 hour Alarm Mask – All alarms reported History Mask – All event types reported
<b>MAXIMUM OPERATING PRESSURE</b>	200 psi (13.8 bar)		

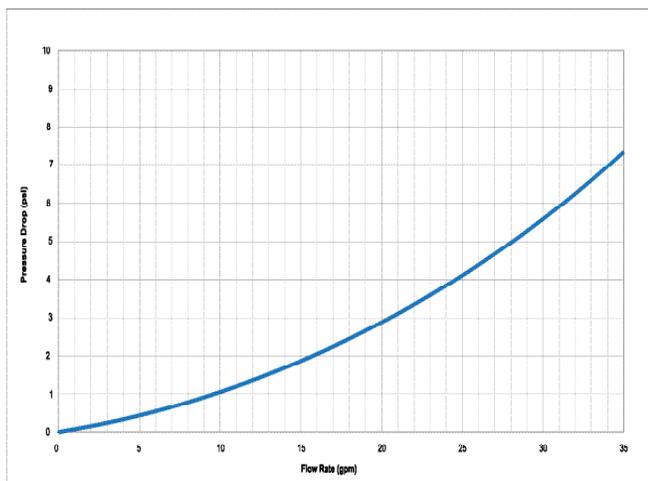
## HEADLOSS CURVES



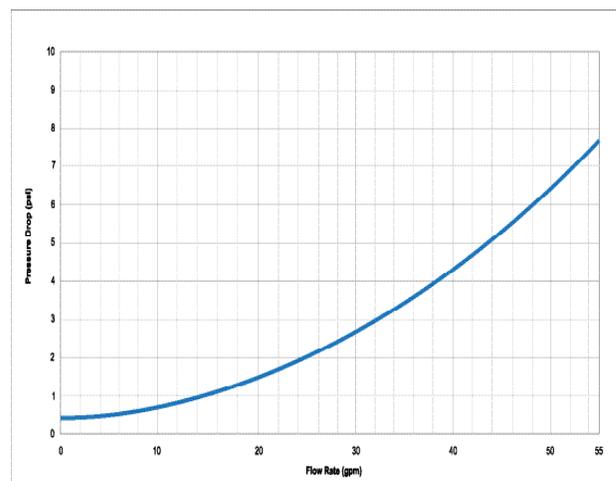
5/8" Headloss Curve



3/4" Short Headloss Curve



3/4" Headloss Curve



1" Headloss Curve

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### SYSTEM OVERVIEW

The Sensus FlexNet System is a wide area Advanced Metering Infrastructure (AMI) system that provides the ability to read water, gas and electric meters with a common AMI platform. The FlexNet system is designed around the central concepts of Simplicity, Flexibility, and Reliability. The system supports one-way radio frequency (RF) transmission for water and gas meters, and offers two-way RF functionality for electric meters, including on-demand readings, remote disconnects/reconnects, and load shedding.

The system transmits using a patented (7-level FSK) RF modulation developed specifically for AMR/AMI applications. The system transmits on a primary use (unshared) licensed band in the 890-960 MHz spectrum. Due to licensed band operation, the FlexNet system can transmit at the highest power levels available with any AMR/AMI system (up to 2 Watts) and with a variety of transmission modes ("normal" mode, "buddy" mode, and "boost" mode). Use of licensed band also ensures that performance will not degrade over time due to interference from other systems and devices. The low noise floor of the licensed band and higher transmission power of the endpoints combine to provide the Flexnet system the highest range of any system on the market. The high power, various transmission modes, primary-use licensed band operation, and long range allow for the smallest infrastructure footprint in the industry. In addition, the water and gas meter endpoints provide four (4) transmissions per day with a twenty (20) year battery warranty. Hourly readings can be included in the four (4) daily transmissions. The SmartPoint transmitter can store hourly readings, and each transmission contains between 8-168 prior readings. This allows the system database to backfill any readings from transmissions that may be missed.

The Sensus FlexNet system is a "single-tier" system, meaning that readings are transmitted directly from the meter endpoint to one or more Tower Gateway Base Stations (TGBs) which are usually miles apart from each other. No complex series of collectors are required to "store and forward" reading data due to the excellent network performance capabilities. Upon reaching the TGBs, the readings are sent immediately to the back-end software (RNI and MDM) via any available Ethernet connection (wired, wireless, Wi-Fi, fiber, frame relay, analog modem). Typical range from the endpoints to the TGB varies due to many factors (building density, topography and foliage), but reliable communications can be established between SmartPoint via one of the variety of transmit modes (established at installation time). The FlexNet system supports long range reliable transmission which can be achieved with minimal infrastructure. This in turn results in low overall maintenance costs. The utilization of primary-use licensed spectrum ensures that the system performance (value) will be protected for the long term from interference, which can severely degrade performance in license free ISM band or secondary use spectrum fixed base systems.

The back-end FlexNet software allows very easy interface to most Customer Information and Billing software packages. The Meter Data Manager (MDM) is accessed via an internet browser, which means that the FlexNet system does not

require any special client software to be installed on user PCs. The Meter Data Manager (MDM) software can easily be configured to work with various billing system file formats without any reprogramming, offering compatibility with virtually every utility billing software package on the market. The web architecture allows multiple users to access the system locally or remotely, and provides the ability for Sensus to provide remote support if desired by the utility.

### AMI SMARTPOINT™

The water and gas SmartPoint transmitters are capable of collecting readings from the meter on an hourly basis. The SmartPoint transmits the reading data to the Tower Gateway Base Station (TGB) four (4) times per day. Each transmission shall contain the past 8-168 readings in order to provide redundancy. If a transmission is missed, the system is capable of recovering the missed reading information from the SmartPoint on the next transmission. After being transmitted from the meter endpoint, transmissions immediately received at the back-end software for review. No "storing and forwarding" of readings on collectors shall be acceptable. Low power endpoints originally designed for walk-by/driveby applications shall not be acceptable due to low power and range capabilities, and undesirable quantity of required "collectors".

Electric SmartPoint transmitter operation shall allow true two-way RF operation, providing "on demand" reading and remote connect and disconnect capability.

The water SmartPoint transmitter is enclosed in a two-piece molded plastic housing capable of being installed through the meter or vault lid. The plastic housing incorporates a tamper resistant, waterproof connection technology. The electronics of the transmitter are hermetically sealed in a High Density Polyethylene (HDPE) enclosure that is waterproof and provides an operating temperature range of -30°F to 165° F (-34°C to 74°C). The pit set SmartPoint transmitter may be completely submerged in water for the life of the product without any internal damage or malfunction. The two-piece enclosure must contain the unit components including, HDPE enclosure, battery, and wire connections. The unit is available with TouchCoupler technology (or equivalent) that eliminates the need for wire connectors.

The water SmartPoint is a one-way device that transmits at a power level of up to two (2) Watts in primary-use licensed band in the 900 MHz spectrum. The transmitter can transmit at least eight (8) reading digits from the encoded register in a resolution of at least 0.1 gallon or 0.01 cubic feet for meters up to 1 inch. Water SmartPoint transmitter also has the ability to provide leak detection capability. The water SmartPoint transmitter also provides the ability for field replaceable batteries.

The meter endpoints are FCC Part 90, 101, and 24 approved for licensed band operation, and communicate with the TGB using an RF modulation designed specifically for AMR/AMI applications. Furthermore, the modulation uses CRC-32 error detection and Viterbi forward error correction scheme capable of recovering up to one bit error out of every three bits. The receiver has a sensitivity of -109 dBm or better for mPass

mode operation in order to provide adequate range for minimal infrastructure.

### TOWER GATEWAY BASE STATION (TGB)

The Tower Gateway Base Station (TGB) receives and processes the readings from the meter transmitters, and convey the data immediately to the Regional Network Interface (RNI) for storage in the database where it can be viewed by utility personnel. The TGBs provide for redundant, overlapping coverage of meter endpoints. No “collectors” using “store and forward” technology as the primary method of operation shall be acceptable. Each Tower Gateway Base Station or pole top collection device provides a live, two-way Ethernet connection with the back-end computer system (RNI). The TGB is supplied with an eight (8) hour battery back-up in the event of primary power loss. In the event of a power loss greater than eight (8) hours, the FlexNet system can recover missed readings by backfilling prior readings sent with each transmission from the SmartPoint .

The TGB has the ability to maintain at least one primary and one secondary data link to the back-end system (RNI). Both primary and secondary data links provide for two-way Ethernet (TCP/IP) communications. Both the primary and secondary data links can be any form of Ethernet chosen by the utility (wired, wireless, Wi-Fi, fiber, frame relay, leased line, POTS, etc.). The system is capable of operating at a data rate of 33.6 BAUD or greater between the TGB and RNI. The TGB has the ability to store up to 30 days of meter reading data from all meter endpoints in its service area in the event of extended failure of the data links to the utility office. If communication links cannot be re-established within 30 days, the system allows a laptop computer to be connected to the TGB to recover reading data.

The system is “single-tier”, meaning that the SmartPoint endpoint transmits directly to a Tower Gateway Base Station (TGB) with a live, two-way Ethernet link to the back-end system in the utility office. Repeaters or “Buddy Boxes” may be used, and provide for instant forwarding of the reading data to a Tower Gateway Base Station (TGB).

### REGIONAL NETWORK INTERFACE (RNI)

The RNI is the network backbone of the system. It receives and stores the reading data from the TGBs, and presents it to the user via the Meter Data Manager (MDM) software. The RNI also monitors system health of the TGB(s). The two servers consist of the Network Controller (NC) and the Utility Information Platform (UIP). The Network Controller (NC) maintains communications with the TGB(s) and routes the data to the Utility Information Platform (UIP). If the Network Controller loses communications with the TGB(s), the TGB(s) will automatically store up to thirty (30) days of metering data. The TGB automatically downloads the stored meter reading data to the Network Controller (NC) once communications are re-established.

The Utility Information Platform (UIP) collects the raw meter data from the Network Controller (NC). The UIP uncompresses the meter data and stores the most current data. The UIP also uses the redundant information contained in each transmission to fill in any missed meter readings from

prior transmissions. The FlexNet system can store up to 13 months of meter reading data in conjunction with the Meter Data Manager (MDM) software.

The operating platform used in the Regional Network Interface (RNI) consists of multiple servers, a Network Controller (NC) and a Utility Information Platform (UIP). The Network Controller (NC) uses the Red Hat (Linux) operating system, and the Utility Information Platform (UIP) uses the Windows 2003 Server operating system. Both servers use a RAID 1 hard drive array for redundancy. The UIP maintains at least sixty (60) days of data on the dual redundant hard drives. The Regional Network interface (RNI) servers, in conjunction with the Meter Data Manager (MDM) software, maintain a 13 month deep history of meter reading data. This data is available for review at any time via the Meter Data Manager (MDM).

### METER DATA MANAGER (MDM)

The Meter Data Manager (MDM) acts as a middleware between Customer Information Systems (CIS) and the Sensus FlexNet Regional Network Interface (RNI).

The MDM has the ability to accept data from the CIS system and export data back to the CIS system using various outputs in a simple flat text. These formats are user configurable and managed within the MDM software without custom programming in either the MDM or the CIS system.

The MDM provides management reports for the data collected by the FlexNet system. The MDM system and management reports have the ability to identify all of the following (among others): all meters read, all unread meters, High/Low meter usage, possible leak conditions, hourly, weekly, monthly, bi-annual and yearly consumption with selectable date ranges. The MDM provides graphing.

### PERFORMANCE WARRANTIES

In evaluating bid proposals, warranty coverage will be considered. The vendor shall be required to state its warranty and/or guarantee policy with respect to each item of proposed equipment. The procedure for submitting warranty claims must also be approved.

As a minimum, the transmitter electronics shall be warranted for twenty (20) years from the date of shipment for defects in materials and workmanship. Battery warranty shall be twenty (20) years from date of factory shipment. For additional information on warranties refer to Sensus publication G-500.

### SYSTEM MAINTENANCE AND SUPPORT

In addition to warranty periods, vendors are required to supply information on required or optional maintenance programs beyond the warranty period for both hardware and software. Features of those programs shall also be included with any additional charges such as hourly rate for on-site and/or remote support. The locations of and procedures for obtaining such support shall be stated.



# Fixed Base AMI System

## Bid Specifications

### SPECIFICATIONS

This document is intended to provide specifications for a Fixed Base AMI System.

#### 1. SCOPE OF WORK

The utility issues this document for the purpose of identifying the specific feature requirements for an AMI Fixed Base System. The AMI Fixed Base solution must be capable of meeting the data collection needs of the utility now and in the future for a specified area. The scope of work involves, but is not limited to, providing and installing an AMI Fixed Base System which includes software, hardware, and all necessary training and installation support. The AMI Fixed Base System shall collect meter data and alarms from the utility meter base and transmit the data wirelessly "over-the-air" to one or more Tower Gateway Basestation data collection points. The AMI Fixed Base system should be compatible with Sensus, Neptune (ProRead) Badger (ADE), and Elster (Incorporating Sensus protocols) water meters equipped with absolute encoder registers. All components of the proposed system must be provided by the same company.

#### 2. FIXED BASE SYSTEM OVERVIEW

The Fixed Base AMI System must provide two-way communication from the Host Software/Computer to strategically located Tower Gateway Basestations (TGB) and also have the ability to communicate down to the installed Meter Transceiver. The two-way communication should allow for time synchronization (+/- 1 Minute of NIST), firmware upgrade and programming options to the TGBs and also the Meter Transceivers. These applications must be performed "over-the-air" and without the need to visit a SmartPoint. The communication from the TGB to the Meter Transceivers must utilize a primary licensed FCC Narrow Band two-way frequency. The System must be capable of migration from mobile to fixed base AMI and shall allow data collection (manual, mobile RF, and/or fixed base) to operate together seamlessly in a mixed system that utilizes the same technology with a common interface to the Utility's CIS. The System shall provide a secondary means of reading meters equipped with a fixed base SmartPoint via a handheld device equipped with an RF transceiver.

The Fixed Base AMI System must be designed to provide coverage for all meters located within the specific utility territory to collect data. The Fixed Base System must have the ability to support conservation initiatives, off cycle reads, customer leak detection alerts, reverse flow and distribution line leak detection. During the programming initialization, the system should provide the ability to identify successful transmission and allow the installer the ability to verify transmission success while at the installation site. The data collection devices should incorporate a store-and-

forward redundancy feature and should transmit the data to the back end system immediately upon receipt.

The Fixed Base Host Software shall provide numerous applications and/or feature sets to support various departments such as customer service, billing, operations, meter reading, revenue protection and others. The software should allow for configurable reports using the data collected. The software should provide pull down easy application screens for the end user to manage the system. Specific reports should be automated to inform the end user when alarm conditions occur or insufficient data has been collected from specific accounts and or regions. The software should also provide customizable usage graphs for applications that can be set to report daily/weekly/monthly and hourly data. The system will also provide the ability to incorporate mapping capabilities for proactive maintenance and analyzing purposes.

#### DEFINITIONS:

- Fixed Base System ("System"):** The Fixed Base System consists of Fixed Base Host Software, Tower Gateway Basestations (TGB's), Communications backhaul/Wide Area Network (WAN), and Fixed Base Radio Frequency Meter Transceivers to enable the remote collection of metering data from absolute encoder-equipped water meters or other compatible devices.
- Host Software:** The Fixed Base Host Software package is installed on the host system at the utility site or a remote location. The Fixed Base Host Software shall manage the communication with the TGB's and Meter Transceivers. The host software will also serve as the interface to the Customer Information system (CIS) and/or billing system. The transfer process is initiated by a file transfer that utilizes an import and export process. The Fixed Base Host Software shall contain a graphic user interface (GUI), configurable reporting, automated processing capabilities and mapping. The host system will have the ability to interface to multiple billing and CIS systems. The host software will serve as the data collection repository from either a mobile and/or fixed base solution.
- Wide Area Network (WAN):** The WAN is the communications link between the Fixed Base Host Software and TGB's. The standard WAN backhaul is ethernet.
- Tower Gateway Basestation (TGB):** The TGB is the enclosed hardware/software that serves as the communication link between the Fixed Base Meter Transceiver and the Host Software. The TGB will incorporate two-way communication capabilities to receive, store and transmit meter data and commands immediately. The TGB must also have the ability to store up to thirty days worth of data in case of an unexpected loss of power or communications with the host software.

## DEFINITIONS (CONTINUED):

- **Fixed Base Radio Frequency Meter Transceiver:**  
The Meter Transceiver is the radio frequency data collection device that attaches to the meter for the purpose of collecting and transmitting meter reading data, unique identification numbers, operating status information and various alarms. The Meter Transceiver transmits on a Primary-Licensed Narrow band FCC frequency. The Meter Transceiver shall be a high-power (transmitting at up to two watts), two-way communication device that is available in both wall and pit mount configurations. The Meter Transceiver must also be available in configurations that can incorporate up to two meters. In addition, the Meter Transceiver must be programmable “over-the-air” to transmit both an hourly time-synchronized meter reading and usage/data transmitted to Host Software at a minimum of four (4) times per day. The Meter Transceiver must be capable of being programmed to transmit alarms for leak, broken pipe and reverse flow events.

## 3. FIXED BASE SOFTWARE OVERVIEW

The Host Software must exist as a browser-based application that runs on a server. The Host Software should interface with Sensus file layout format to interface to the Utility's CIS for meter reading. The Host Software should support fixed base AMI, handheld meter reading and mobile meter reading on one platform. The Host Software must support reading performance reports and advanced usage analysis capabilities. The Host Software must be able to export data to Microsoft Excel and Adobe PDF formats. The Host Software shall have the basic capability of providing the following data to utility on a daily basis for monthly billing applications:

- An hourly time-stamped meter reading taken from all water meters for monthly billing purposes from the Fixed Base Meter Transceiver;
- Hourly usage/consumption readings for resolution of customer billing disputes and improved customer service from the Fixed Base Meter Transceiver;
- Collect and report on the alarm data received from the Meter Transceivers (non-read, non-numeric read);
- Collect and report on the leak data received;
- Hourly Reading data for Meter Transceivers in the system that can report the consumption intervals for a selected time-frame.

### 3.1 HOST SOFTWARE REQUIREMENTS

The Host Software must provide all the control needed in the network and provide for the essential functions of network management, meter communications, reporting, database configuration and alarms monitoring. It shall comply with prevailing industry standards and should run on a Windows-compatible computer. The Host Software must be able to interface with handheld and mobile meter reading software to enable a mixed meter reading approach that utilizes the same technology. The Host Software must interface to the utility's CIS/billing software. The meter reading data communicated to the CIS system shall be provided in an ASCII flat file format. The server hardware must be provided by the vendor for installation at the host site. The user computer hardware is to be provided by the utility and must meet the following basic requirements.

## COMPUTERS MUST MEET THE FOLLOWING MINIMUM REQUIREMENTS:

- Windows 2000® /Windows XP®
- Intel 800-megahertz (MHz) processor or faster
- At least 512 megabytes (MB) of RAM (1 GB is recommended)
- At least 1.5 gigabytes (GB) of available space on the hard disk
- Microsoft Internet Explorer 7 or greater
- Keyboard and a Microsoft mouse or some other compatible pointing device
- Video adapter and monitor with Super VGA (1024 X 768) or higher resolution
- 56 kilobits per second (Kbps) or higher-speed modem
- Network adapter appropriate for the type of local-area, wide-area, wireless or home network you wish to connect to, and access to an appropriate network infrastructure; access to third-party networks may require additional charges.
- File transfer protocol (FTP) access

### 3.2 INFORMATION REQUIREMENTS

The host software must support the following information requirements:

- Storing additional meter readings and status flag information from other monitoring devices (such as distribution line leak noise loggers,).
- Must support single and dual register meter information.
- Must support meter readings (4-8 digits) and Meter Transceiver ID numbers up to 10 digits.
- Must interface with handheld device and vehicle-based reading equipment to support mixed system operation.
- Must support GPS type data to identify locations of account geographically.
- Capability to store all meter data information obtained from the TGB's for 13 months.
- The System must be able to monitor the status of the WAN and alert the user in the event of a problem impacting communication between the TGB's and Fixed Base Software (Server receiving alarm information about signal strength, etc).
- The system must provide for the ability to monitor the status of the TGB and provide alarms back to the utility.
- The System must have the capability to monitor Meter Transceivers that have transmitted for the first time to identify successful installation and operation.
- The supplier must provide the service of remotely monitoring the system and have controls in place to ensure optimized system operation.
- There must be capability to monitor status/performance of the TGBs strategically located in the network.
- Diagnostics must be available such that operators can evaluate performance and send instructions “over-the-air” to optimize performance of the network.

### 3.3 NETWORK MANAGEMENT

The Fixed Base system must provide a "Health Management" application within the host software to monitor the status of the TGB's. The network monitoring solution should provide data with regards to the Meter Transceiver transmission strength and its corresponding TGB and/or multiple TGB's. Reports should be available on a daily basis and must have the ability to alert appropriate personnel of certain triggered alarms.

### 3.4 BASIC FUNCTIONS

The Host Software must provide the ability to maneuver data to various reports and also to compatible software applications. The system should provide the ability to verify the percentage of reads received for particular areas and/or selected meter routes. This data should then be exposed to various configurable parameters set, such as high/low parameters to assure the accuracy of the data. Once this review has taken place, the data should then be grouped for exporting purposes to the billing and/or CIS system within the utility. The host software must also have the ability to group route information and both import and export that data to a handheld meter reading and/or programming device.

The Mobile Host Software must include the following:

- Loads to/unloads from the handheld devices by serial communications at a minimum speed of 19,200 bps and via Ethernet communications at a minimum speed of 10 Mbps.
- Provides database with optional backup/restore capability.
- Enables the user to specify the data to be exported from the database for transferring to the billing system.
- Enables the user to search the database for records matching specified information.
- Allows the user to define up to 100 notes.

#### 3.4.1 TYPICAL READ CYCLE

In a typical Read Cycle, the Host Software must allow the following operations:

- Merging of routes into the existing database for loading onto a data collection device.
- Posting of readings from the data collection device onto appropriate accounts within the database.
- Creation of a backup copy of the routes within the database (including current system configuration files).
- Printing pre-selected reports.
- Exporting routes from the database to the utility billing system.

### 3.5. REPORTING

The Host Software must provide normal reporting and exceptional reporting capabilities that must address basic operational requirements:

- The Host Software must have the ability to identify three types of reading information to include;
  1. Numeric reads (successful reads that can be used for billing)

2. Non-numeric reads (reads that cannot be used for billing but may indicate a problem with the meter register or Meter Transceiver or tamper condition); and
3. No readings (no transmitted reading was received).

- The Host Software must allow the user to review total number and percentage of successful reads, unsuccessful reads, and no reads.
- Network Level Reports – must identify by day or date range, a summary of the total number and percentage of successful reads, unsuccessful reads, and no readings.
- TGB Level Report – must provide a summary of the total number and percentage of successful reads, unsuccessful reads and no readings.

Standard reporting to include the following information:

- Zero Consumption
- Unread Meter (no readings)
- Billing List (numeric reads)
- All Readings
- Invalid Readings (non-numeric reads)
- Meter ID Mismatch
- Meter Transceiver ID Mismatch
- Meter Transceiver Status
- Reading Summary (Statistics page, Read vs UnRead/ Non-numeric)
- Reverse Flow Event
- Leak Events
- Acoustic Leak Loggers (such as the AMR Permalog on the distribution lines)

The Host Software must allow the user to select specific fields from the database to be exported to a third-party report generator for custom reports.

## 4. TOWER GATEWAY BASESTATION (TGB)

### 4.1 BASIC REQUIREMENTS

The TGB must demonstrate the capability to collect data wirelessly from the Meter Transceiver and communicate back to the Fixed Base Host Software:

- The TGB must support two-way communications over an FCC primary licensed frequency with the Meter Transceiver and provide such functionality as priority alarms and over-the-air updates.
- The TGB must be flexible with regards to installation option
- The TGB must be AC powered.
- The TGB must provide memory back-up (30 days).
- The TGB must utilize a Linux operating system.
- The TGB must be able to support and process up to 50,000 Meter Transceivers.
- The TGB must have a battery backup capable of maintaining eight hours of support.

## 4.2 WIDE AREA NETWORK (WAN) BACKHAUL REQUIREMENTS

The TGB must be capable of using both a primary and secondary data links providing two-way ethernet TCP/IP with the following as WAN backhauls for data:

- Wired (DSL or cable)
- Wireless
- Wi-Fi
- Fiber
- Frame relay
- GPRS

## 4.3 POWER REQUIREMENTS

- The TGB must be powered via 110 - 220V AC.
- Upon power failure, the TGB shall retain the past thirty (30) days of meter data in a non-volatile memory.
- Upon start-up after power failure, the TGB must restore databases, tables, and logs to the previous state.

## 4.4 COMMUNICATION REQUIREMENTS

- The TGB must have a transmitter capable of sending out thirty-five (35) watt transmissions.
- The TGB must log all events mentioned below and communicate to the host computer:
- Link failures:
  - The TGB link failure time and date-to-the-Host must be logged and all data must be saved thirty (30) days.
  - The TGB must try continuously to re-establish a link to the host.
- Reset:
  - The TGB must be able to be reset by the Host computer.
  - Manual reset functionality must be available.
- The TGB shall transfer the past thirty (30) days of data stored in a non-volatile memory to the Fixed Base Host Software upon power up reset.

## 4.5 INSTALLATION/MOUNTING REQUIREMENTS

The TGB antenna should have the ability to be installed on the top of water towers. Other installation applications should include cell towers, tall buildings, and/or other elevated structures. The TGB must be powered by 110–220VAC.

## 4.6 ENVIRONMENTAL CHARACTERISTICS

- The TGB must have an operating temperature of -22°F to +140°F (-30°C to +60°C).
- The TGB must have a storage temperature of -40°F to +185°F (-40°C to +85°C).
- The TGB must have an operating humidity of 0 to 95% Non-Condensing.
- The TGB must have a NEMA 3R enclosure and pass the UL50 (Underwriter's Laboratory) rain test.
- The TGB must meet vibration requirement of MIL-810F.

## 4.7 APPROVALS

- The TGB must be UL Listed.
- The TGB must be CSA Approved.
- The TGB must meet FCC Part 90.

## 5. FIXED BASE METER TRANSCEIVER

The Meter Transceiver(s) must be an electronic device that allows for the connection to an absolute encoder register. As defined by pre programmed settings, the Meter Transceiver shall interrogate the encoder register and transmit the meter reading and other information to a Tower Gateway Basestation. The Meter Transceiver shall be compatible with Sensus, Neptune (ProRead), Badger ADE, and Elster (Sensus protocol incorporated) absolute encoder registers. The Meter Transceivers shall attach to meters with Sensus encoder registers by TouchCoupler technology, or they shall easily retrofit to existing meters with encoder registers in the field. The Meter Transceiver shall be manufactured in both non-pit and pit set models. The Meter Transceiver should have the capability to have at least two registers attached to one Meter Transceiver. The Meter Transceiver shall have the ability to be mounted on a wall. The pit set Meter Transceiver shall have the ability to be mounted in a pit set environment or an underground vault. The non-pit and pit set Meter Transceiver shall have the battery and electronics encased in High Density Polyethylene (HDPE) waterproof design.

## 5.1 PHYSICAL/MECHANICAL REQUIREMENTS

### Non Pit Meter Transceiver

- The non pit Meter Transceiver housing shall be constructed of a polycarbonate plastic compound. The battery and electronics will be housed in High Density Polyethylene (HDPE). The Meter Transceiver shall be capable of operating at temperatures of -30°F to +165°F (-34°C to +74°C) with a humidity of 0 to 95%.
- The Meter Transceiver must be waterproof and capable of exposure to water spray and splash. The Meter Transceiver shall provide a location for a tamper deterrent seal.
- The Meter Transceivers must be capable of being field retrofit to existing meter / encoder register installations using TouchCoupler or wired connections.

### Pit Set Meter Transceiver

- For pit or vault applications, the pit Meter Transceiver antenna shall be designed to be installed through the industry standard 1-3/4" hole in the pit lid with no degradation of transmission range. The pit set Meter Transceiver antenna unit will be capable of mounting to various types and thicknesses of pit lids — Cast Iron, Aluminum, Concrete, Composite or Plastic from 1/2" to 2-1/2" in thickness. The pit set Meter Transceiver design shall not require the replacement of the pit lid material to plastic to improve the propagation of the RF signal.
- The device shall be capable of operating at temperatures of -30°F to +165°F (-34°C to +74°C) and be 100% submersible.
- The Meter Transceiver circuit board and battery will be encapsulated in High Density Polyethylene (HDPE) for superior water ingress protection. The pit set Meter Transceiver must be suitable for operation in flooded pits and be able to be submerged for extended periods of time. The range will not be affected when the pit is flooded, provided the pit Meter Transceiver antenna is not submerged under water.
- The pit set Meter Transceiver antenna shall be made of a material to withstand traffic.
- The pit set Meter Transceiver shall provide a location for a tamper deterrent seal.
- The pit set Meter Transceiver must be capable of being field retrofit to existing meter using TouchCoupler connections or wired connections for encoder register installations.

## 5.2 OPERATION SPECIFICATIONS

- The supplying vendor shall be the sole manufacturer of the different elements comprising the fixed base system which include the Meter Transceivers, Data Collection devices, programmers and software.
- The Fixed Base System shall operate on a primary licensed FCC frequency within the 900-950 MHz band and operate within FCC CFR 47: Part 90 regulations for this band.
- The Meter Transceiver shall utilize two-way communications with the Tower Gateway Basestation to allow for "over-the-air" communications between the two devices for re-programming and time synchronization.
- The Meter Transceiver shall be configurable via "over-the-air" communications.
- Power shall be supplied to the Meter Transceiver by a lithium battery and a capacitor. The Vendor shall warrant that any battery provided and installed in the Meter Transceivers by the Vendor shall be free of manufacture and design defects for a period of twenty (20) years - the first ten (10) years from the date of shipment from factory will be warranted for full replacement cost, and the second ten (10) years will be warranted on a prorated basis, as long as the Meter Transceiver is working under the environmental and meter reading conditions specified.
- The Meter Transceiver must allow for the option of a field-replaceable battery and be designed for minimum twenty (20) years life expectancy.

- The Meter Transceivers must be capable of reading two encoder registers at one time.
- The Meter Transceiver shall interface to Sensus, Neptune (ProRead) Badger ADE, and Elster (Sensus protocol incorporated) absolute encoder registers via a three-conductor wire or TouchCoupler technology without need for special configuration/programming of the Meter Transceiver.
- The Meter Transceiver shall transmit up to six times per day under normal transmission conditions without impacting the battery life. The Meter Transceiver shall have the ability for time synchronization.
- The Meter Transceiver programmer should have the ability to place the Meter Transceiver into the optimum transmission mode during programming.
- In addition, if the Meter Transceiver is configured in hourly usage, the Meter Transceiver shall provide the current meter reading and a data packet with hourly historical data .
- Each Meter Transceiver shall provide a unique pre-programmed eight digit identification ID number. Each Meter Transceiver shall be labeled with the ID number in both numeric and bar code form. The label shall also display FCC approval information, manufacturer's designation, and date of manufacture.
- The Meter Transceiver shall transmit the encoder meter reading and a unique 8 digit Meter Transceiver ID number.
- Tamper - If wiring between the Meter Transceiver and encoder register has been disconnected/cut, a "non-reading" shall be transmitted indicating wire tamper. The System should have the ability to validate that the installation is successful at the installation site. The system shall also provide for the provision to interrogate the Meter Transceiver to extract a reading that will be displayed on the programmer. The installation tool shall display the Meter Transceiver ID number, valid meter reading and the signal strength (SNR = Signal to Noise Ratio) of the communication between the Meter Transceiver and Tower Gateway Basestation.
- The Meter Transceiver shall have the capability of sending alarms for leak, tamper, and backflow when connected to an absolute encoder register and reading data from a distribution line leak detection device.

## 6. TRAINING AND SUPPORT

The vendor must support new and ongoing training sessions and material that relates to the operation and maintenance of the fixed base system. Vendor will provide a detailed schedule of training options and also perform on-site training sessions for various employees of the utility. The vendor proposal must also include other remote training alternatives for new and existing employees. The vendor must also support a users conference/Forum in which users of the fixed base system have the ability to provide feedback for new products and best practices.

## 6.1 SUPPORT SERVICES

The vendor shall have a fully trained Technical Support Department. The utility must have access to technical questions thru a telephone based support desk. The trained technicians should be capable of answering and responding to various requests such as, but not limited to:

- Hardware, operational maintenance questions and problems.
- Software operational questions and problems.
- Assisting customer with configuring reports
- Assisting with software updates
- Troubleshooting hardware issues
- Providing on-site training or evaluation as needed.

The Help Desk must be available weekdays between 8:00 a.m. and 6:00 p.m. EST with after-hours numbers available as needed.

## 6.2 INSTALLATION AND TRAINING

The vendor will provide a complete set of installation and operating instructions for all the components of the fixed base system. Onsite training by authorized vendor personnel or their representatives must be provided. The vendor must also arrange a pre-deployment meeting to identify the critical path items for installation and training needs.

## 7. WARRANTIES

In evaluating bid submittals, warranty coverage will be considered. The Vendor shall be required to state its warranty and/or guarantee policy with respect to each item of proposed equipment. The procedure for submitting warranty claims must also be provided. As a minimum, the Meter Transceiver must have a twenty (20) year warranty and the Tower Gateway Basestation (TGB) shall be warranted for one (1) year from date of shipment for defects in material and workmanship.

## 8. SYSTEM MAINTENANCE AND SUPPORT

In addition to warranty periods, Vendors are required to supply information on required or optional maintenance programs beyond the warranty period for both hardware and software. The location of and procedures for obtaining such support shall be stated. A toll-free Help Desk number must be provided for system support.

## 9. VENDOR QUALIFICATIONS

The qualified Vendor will have a minimum of thirty (30) years experience with meter reading systems. The selected Vendor shall be thoroughly versed in encoder meter and radio frequency AMI technology and be a major supplier in the marketplace. The proposed system shall be manufactured and maintained by the selected Vendor. A customer reference list shall be enclosed with the proposal.



# FlexNet™ Base Station

Transceiver



## Empowering Utility Networks

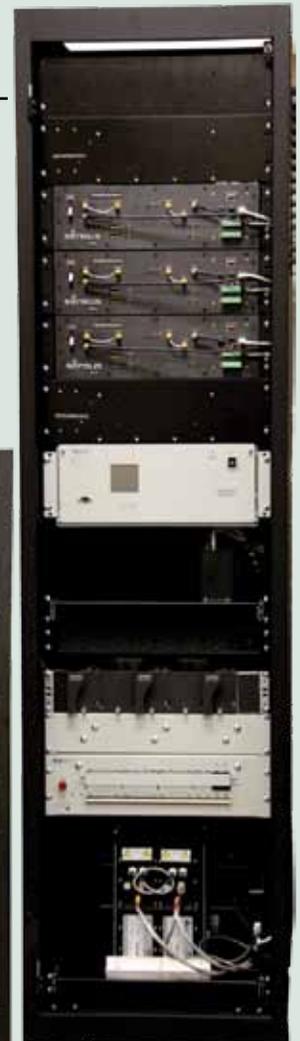
The FlexNet™ Base Station is a long range radio transceiver that communicates information to and from the utility Regional Network Interface (RNI) with FlexNet SmartPoint™ modules deployed throughout a water, gas or electric utility network. FlexNet Base Station transceivers are mounted in NEMA-certified enclosures at strategic locations within your service territory, ensuring optimal coverage over large geographic areas.

FlexNet Base Station transceivers utilize primary-use, FCC-licensed frequencies in the 900 MHz narrowband PCS or MAS radio spectrum, allowing your system to broadcast at an industry-leading 30 watts of power (6 watts for Metro). Not only does this translate into superior performance and signal clarity, but significantly less radio infrastructure as compared to networks relying on unlicensed/unprotected frequencies.

Base Station S50/S100  
Single Long Range  
Base Station



Base Station T50/T100  
Tri-sector Long Range  
Base Station



Base Station D50/D100  
Dual Transceiver Long  
Range Base Station

Base Station METRO  
Single Short Range  
Base Station



## Applications

FlexNet Base Stations offer true two-way communications including top- and middle-of-minute (MOM) intervals with:

- Advanced Meter Infrastructure (AMI) - electric, water and gas
- Distribution Automation (DA)
- Demand Response (DR)
- Home Automation Networks (HAN)

## Components

- GPS receiver with 1ms sampling
- Duplexer for single antenna; antenna combiner for multi-unit applications
- Low-noise receiver amplifier (LNA)
- IP-addressable power supply
- Battery charger
- 8-hour battery backup
- Alarms and reporting capability
- Backhaul via Ethernet/IP

## Configurations

Model	S50/S100	D50/D100	T50/T100	Metro
Bandwidth	50 or 100 KHz			
Transceivers	One	Two	Three	One
Spectrum	Licensed PCS/MAS	Licensed PCS	Licensed PCS	Licensed PCS/MAS
<b>Receiver Sensitivity (all models)</b>				
Normal	-122 dBm			
1/2 Baud Rate	-125 dBm			
Boost	-132 dBm			
<b>Demodulation (all models)</b>				
Normal Mode	7 FSK, 8 kbps			
C&I Mode	7 FSK, 4 kbps			
Priority Mode	13 FSK, 8 kbps			
Boost Mode	7 FSK, .8 kbps			
Double Density Mode	13 FSK, 16 kbps			
<b>Transmitter</b>				
Output Power	30W/45 dBm	30W/45 dBm	30W/45 dBm	6W/37 dBm
Modulation	2 FSK (5/10 kbps)			
Frequency Stability	± 0.05 PPM -30° to +60° C			
FCC Type Acceptance	Part 15, 24, 90, 101			
<b>Enclosure Options</b>				
	Indoor - Short	Indoor - Tall	Outdoor	Metro
Height	48 in. (122 cm)	84 in. (213 cm)	58 in. (147 cm)	37 in. (94 cm)
Width	24 in. (61 cm)			
Depth	28 in. (71 cm)	28 in. (71 cm)	28 in. (71 cm)	23 in. (58 cm)
Max. Capacity	2 transceivers	3 transceivers	2 transceivers	1 transceiver
Voltage	120 VAC	120 VAC	240 VAC	120 VAC

For more information, visit us at [sensus.com](http://sensus.com)

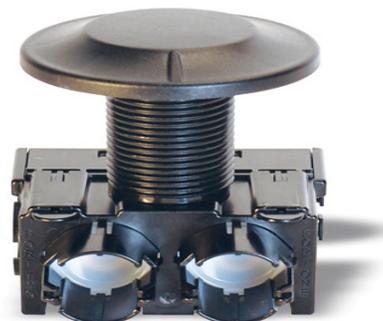
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## Description

### Model 520M – Pit Set

The FlexNet SmartPoint M2 is a radio transceiver that provides water utilities inbound and outbound access to water measurement and ancillary device diagnostics via radio signal. The SmartPoint 520M is designed for submersible, pit-set environments. With its migratable, two-way communication ability, the M-Series SmartPoint functions as a walk-by/drive-by endpoint, fixed base endpoint, or combination of the two. This flexibility increases utility data collection capabilities and streamlines operations.



## Features

### TOUCHCOUPLER DESIGN

The SmartPoint M2 utilizes TouchCoupler, the patented Sensus inductive coupling communication platform to interface with the encoded meter. With TouchCoupler, the SmartPoint M2 can connect to the meter using existing two wire AMR installations instead of requiring utilities to access the meter to install a new three-wire connection. This results in a fast, efficient and reliable connection at minimal cost.

### OPERATION

The FlexNet SmartPoint M2 receives input from the meter register and remotely sends data to a walk-by/ drive-by or fixed base collection device. The SmartPoint M2 easily migrates from walk-by/drive-by to fixed base by simply installing a Base Station.

In walk-by/drive-by mode, the SmartPoint M2 collects data and awaits an activation signal from the Vehicle Gateway Basestation (VGB) or Hand-Held Device (HHD). Upon signal receipt, it transmits readings, the meter identification number and any alarms.

As a fixed-base endpoint, the SmartPoint M2 interacts with one or more strategically placed Base Stations located in the utility service area. Top of the hour readings and other diagnostics are instantly forwarded to the Regional Network Interface (RNI) at time of transmission. The FlexNet system provides unmatched reliability by

using expansive tower receiver coverage of metering end points, data/message redundancy, fail over back up provisions and operation on FCC primary use (unshared) RF spectrum.

### POWERFUL TRANSMISSION, FLEXIBLE PLATFORM

The SmartPoint M2 offers several advantages that control both deployment and lifetime operation costs. It's powerful, industry leading two watt transmitter broadcasts over large distances and minimizes collection infrastructure. And once the SmartPoint M2 is installed, its migratable, two-way system platform can be updated without requiring personnel to visit each meter and/or inconveniencing customers.

### ADDITIONAL SMARTPOINT M2 FEATURES

The SmartPoint M2 obtains hourly readings and can monitor continuous flow over a programmable period of time, alerting the utility to leak conditions. In addition, the SmartPoint M2 stores up to 840 consumption intervals (35 days of hourly consumption), providing the utility with the ability to extract detailed usage profiles for consumer information and dispute resolution. The SmartPoint M2 also incorporates a two-port design, allowing the utility to connect multiple registers and ancillary devices (such as acoustic monitoring) to a single SmartPoint. This results in a compact installation that saves

time, space and money - without reducing system performance.

### SPECIFICATIONS

<b>SERVICE</b>	Pit set installation interfacing the utility meter to the Sensus FlexNet system. Unit requires 1.75" diameter hole in pit lid; fits pit lid thicknesses up to 1.75"
<b>PHYSICAL CHARACTERISTICS</b>	Width: 4.43" x Height: 5.09" x Depth: 3"
<b>WEIGHT</b>	1.0 lbs/16.0 oz
<b>COLOR</b>	Black
<b>FREQUENCY RANGE</b>	900 – 950 MHz, 8000 channels X 6.25 kHz steps
<b>MODULATION</b>	Proprietary Narrow Band
<b>MEMORY</b>	Non-Volatile
<b>POWER</b>	Lithium Thionyl Chloride batteries
<b>APPROVALS</b>	<b>US:</b> FCC CFR 47: Part 90, Part 24D, Part 101C, Part 15 Licensed operation <b>Canada:</b> Industry Canada (IC) RSS-134, RSS-119, RSS-210
<b>OPERATING TEMPERATURE</b>	- 22° F to +185° F - 30° C to + 85° C
<b>OPTIONS</b>	Dual or single port availability; TouchCoupler only, wired only, Nicor connection
<b>INSTALLATION ENVIRONMENT</b>	100% condensing, water submersible
<b>COMPATIBILITY</b>	<b>TouchCoupler and Wired Version:</b> Sensus Encoded Registers Badger ADE water registers and MasterMeter AccuLinX <b>Wired Version Only:</b> Elster Encoder (Sensus protocol) and Neptune ARB VI (ProRead). Hersey Translator
<b>WARRANTY</b>	20 years – Based on six transmissions per day. Refer to Sensus G-500 for warranty.

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## Uponor AquaPEX® White

Submittal Information

Revision H: June 27, 2013

### Project Information

Job Name:

Location:

Part No. Ordered:

Engineer:

Date Submitted:

Contractor:

Submitted By:

Manufacturer's Representative:

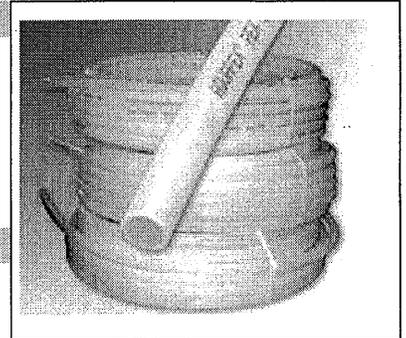
Approved By:

### Technical Data

Material: Crosslinked polyethylene PEX-a Engel Method; PEX 5106

Standard Grade Hydrostatic Ratings (PPI):  
 200°F (93°C) at 80 psi (551 kPa)  
 180°F (82°C) at 100 psi (689 kPa)  
 73.4°F (23°C) at 160 psi (1,103 kPa)  
 ½", ¾", 1", 1¼", 1½" and 2" Uponor AquaPEX® White only:  
 120°F (49°C) at 130 psi (896 kPa)

Linear Expansion Rate: 1.1"/10°F/100' (27.94mm/5.56°C/30.48m)



### Product Information and Application Use

Uponor AquaPEX White is tubing used for hot and cold domestic potable water distribution, residential fire safety and radiant heating and cooling systems containing no ferrous corrodible components or where ferrous components are isolated from the tubing.

✓	Description	Part Number	I.D.	O.D.	Weight
<input type="checkbox"/>	¼" Uponor AquaPEX White, 100-ft. coil	F1040250	0.241"	0.375"	4.0 lbs.
<input type="checkbox"/>	⅜" Uponor AquaPEX White, 400-ft. coil	F1090375	0.350"	0.500"	20.0 lbs.
<input type="checkbox"/>	⅜" Uponor AquaPEX White, 1,000-ft. coil	F1120375	0.350"	0.500"	44.0 lbs.
<input type="checkbox"/>	½" Uponor AquaPEX White, 100-ft. coil	F1040500	0.475"	0.625"	6.0 lbs.
<input type="checkbox"/>	½" Uponor AquaPEX White, 300-ft. coil	F1060500	0.475"	0.625"	18.0 lbs.
<input type="checkbox"/>	½" Uponor AquaPEX White, 500-ft. coil	F1100500	0.475"	0.625"	27.6 lbs.
<input type="checkbox"/>	½" Uponor AquaPEX White, 1,000-ft. coil	F1120500	0.475"	0.625"	54.0 lbs.
<input type="checkbox"/>	⅝" Uponor AquaPEX White, 300-ft. coil	F1060625	0.574"	0.750"	28.0 lbs.
<input type="checkbox"/>	⅝" Uponor AquaPEX White, 1000-ft. coil	F1120625	0.574"	0.750"	86.0 lbs.
<input checked="" type="checkbox"/>	¾" Uponor AquaPEX White, 100-ft. coil	F1040750	0.671"	0.875"	10.0 lbs.
<input type="checkbox"/>	¾" Uponor AquaPEX White, 300-ft. coil	F1060750	0.671"	0.875"	34.0 lbs.
<input type="checkbox"/>	¾" Uponor AquaPEX White, 500-ft. coil	F1100750	0.671"	0.875"	54.0 lbs.
<input checked="" type="checkbox"/>	1" Uponor AquaPEX White, 100-ft. coil	F1041000	0.862"	1.125"	20.0 lbs.
<input type="checkbox"/>	1" Uponor AquaPEX White, 300-ft. coil	F1061000	0.862"	1.125"	56.0 lbs.
<input type="checkbox"/>	1" Uponor AquaPEX White, 500-ft. coil	F1101000	0.862"	1.125"	93.0 lbs.
<input type="checkbox"/>	1¼" Uponor AquaPEX White, 100-ft. coil	F1061250	1.054"	1.375"	34.0 lbs.
<input type="checkbox"/>	1¼" Uponor AquaPEX White, 300-ft. coil	F1021250	1.054"	1.375"	106.0 lbs.
<input type="checkbox"/>	1½" Uponor AquaPEX White, 100-ft. coil	F1061500	1.244"	1.625"	44.0 lbs.
<input type="checkbox"/>	1½" Uponor AquaPEX White, 300-ft. coil	F1021500	1.244"	1.625"	133.0 lbs.
<input type="checkbox"/>	2" Uponor AquaPEX White, 100-ft. coil	F1062000	1.629"	2.125"	68.2 lbs.
<input type="checkbox"/>	2" Uponor AquaPEX White, 200-ft. coil	F1052000	1.629"	2.125"	136.4 lbs.
<input type="checkbox"/>	2" Uponor AquaPEX White, 300-ft. coil	F1022000	1.629"	2.125"	204.6 lbs.
<input type="checkbox"/>	3" Uponor AquaPEX White, 100-ft. coil	F1063000	2.400"	3.125"	128.0 lbs.
<input type="checkbox"/>	3" Uponor AquaPEX White, 350-ft. coil	F1023000	2.400"	3.125"	442.0 lbs.

except in High Traffic Areas

### Installation

Use ProPEX® fittings<sup>1</sup> for ¾" through 2" tubing. Use WIPEX™ fittings for 3" tubing. Refer to the Uponor Professional Plumbing Installation Guide, Radiant Floor Heating Installation Handbook or AquaSAFE™ Residential Fire Sprinkler Installation Guide for more information.

Listings <sup>2</sup>	Codes	Standards
cNSFus-fs <sup>3</sup> ; cNSFus-pw; cQAIus; UL; CSA; WH; ETL; PPI TR-4; ICC-ES; IAPMO; BMEC; CCMC	ICC; IPC; IMC; IRC; UPC; UMC; NSPC; HUD; UFGS; NPC of Canada; NBC of Canada	ANSI/NSF 14; ANSI/NSF 61; ASTM F876; ASTM F877; ASTM F1960; ASTM F2023; ASTM E84; CAN/ULC S102.2; ASTM E119/UL 263; CAN/ULC S101; ASTM E814/ULC S115; AWWA C904 <sup>4</sup> ; CSA B137.5; CSA B214; UL 1821 <sup>3</sup> ; ULC/ORD-C199P <sup>3</sup>

### Related Applications

PEX-a Plumbing Systems  
 Radiant Heating and Cooling Systems  
 AquaSAFE™ Fire Safety Systems

### Contact Information

Uponor, Inc. 5925 148 <sup>th</sup> Street West Apple Valley, MN 55124 USA Phone: 800.321.4739 Fax: 952.891.2008 www.uponorpro.com	Uponor Ltd. 2000 Argenta Rd., Plaza 1, Ste. 200 Mississauga, ON L5N 1W1 CANADA Phone: 888.994.7726 Fax: 800.638.9517 www.uponorpro.com
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<sup>1</sup>ProPEX® is a registered trademark of Uponor, Inc. ProPEX™ is a trademark of Uponor Ltd.

<sup>2</sup>Visit listing agency's website for complete information; <sup>3</sup>For ½", ¾", 1", 1¼", 1½" and 2" tubing only; <sup>4</sup>For ¾" tubing and larger



**NuMex PE4710**  
**ASTM D 2239, NSF Approved for Potable Water Applications (NSF-pw)**  
**SIDR-PR (Standard Inside Dimension Ratio-Pressure Rated)**

Standard Inside Dimension Ratio SIDR-15													
Nominal Size (inches)	Pressure Rating (psi @ 73.4°F water)	Nominal Inside Diameter (inches)	Minimum Wall Thickness (inches)	Weight per 100 feet (pounds)	100' coil length	200' coil length	300' coil length	400' coil length	500' coil length	1000' coil length	1500' coil length	2000' coil length	2500' coil length
3/4	125	0.824	0.060	7.2	x	-	x	x	x	x	-	-	-
1	125	1.049	0.070	10.7	x	-	x	x	x	x	-	-	-
1 1/4	125	1.380	0.092	18.2	x	-	x	x	x	x	-	-	-
1 1/2	125	1.610	0.107	24.9	x	-	x	x	x	x	-	-	-
2	125	2.067	0.138	41.1	x	x	x	-	-	-	-	-	-

Standard Inside Dimension Ratio SIDR-11.5													
Nominal Size (inches)	Pressure Rating (psi @ 73.4°F water)	Nominal Inside Diameter (inches)	Minimum Wall Thickness (inches)	Weight per 100 feet (pounds)	100' coil length	200' coil length	300' coil length	400' coil length	500' coil length	1000' coil length	1500' coil length	2000' coil length	2500' coil length
1/2	160	0.622	0.060	5.5	x	-	x	x	x	x	-	-	-
3/4	160	0.824	0.072	8.6	x	-	x	x	x	x	-	-	-
1	160	1.049	0.091	14.0	x	-	x	x	x	x	-	-	-
1 1/4	160	1.380	0.120	24.3	x	-	x	-	x	x	x	-	-
1 1/2	160	1.610	0.140	33.1	x	-	x	-	x	x	x	-	-
2	160	2.067	0.180	54.5	x	x	x	-	x	x	x	-	-

Standard Inside Dimension Ratio SIDR-9													
Nominal Size (inches)	Pressure Rating (psi @ 73.4°F water)	Nominal Inside Diameter (inches)	Minimum Wall Thickness (inches)	Weight per 100 feet (pounds)	100' coil length	200' coil length	300' coil length	400' coil length	500' coil length	1000' coil length	1500' coil length	2000' coil length	2500' coil length
3/4	200	0.824	0.092	11.4	x	-	x	x	x	x	-	-	-
1	200	1.049	0.117	18.4	x	-	x	x	x	x	-	-	-
1 1/4	200	1.380	0.153	31.6	x	-	x	-	x	x	x	x	x
1 1/2	200	1.610	0.179	43.2	x	-	x	-	x	x	x	x	-
2	200	2.067	0.230	71.0	x	x	x	-	x	x	x	-	-

*Only used in High Traffic Areas*

Standard Inside Dimension Ratio SIDR-7													
Nominal Size (inches)	Pressure Rating (psi @ 73.4°F water)	Nominal Inside Diameter (inches)	Minimum Wall Thickness (inches)	Weight per 100 feet (pounds)	100' coil length	200' coil length	300' coil length	400' coil length	500' coil length	1000' coil length	1500' coil length	2000' coil length	2500' coil length
3/4	250	0.824	0.118	15.0	x	-	x	x	x	x	-	-	-
1	250	1.049	0.150	24.3	x	-	x	x	x	x	-	-	-
1 1/4	250	1.380	0.197	41.8	x	-	x	-	x	x	x	x	x
1 1/2	250	1.610	0.230	56.9	x	-	x	-	x	x	x	x	-
2	250	2.067	0.295	93.8	x	x	x	-	x	x	x	-	-

### Typical Physical Properties<sup>1</sup> of NuMex PE4710 Polyethylene Pipe Resin

Properties	Test Method	Typical Value
<b>Mechanical Properties</b>		
Tensile Strength (break), psi	ASTM D 638	5,500
Tensile Strength (yield), psi	ASTM D 638	3,625
Ultimate Elongation, %	ASTM D 638	>600
Flexural Modulus (2% Secant), psi	ASTM D 790	150,000
<b>Thermal Properties</b>		
Brittleness Temperature, °C	ASTM D 746	<-118
High Load Melt Index, g/10 minutes	ASTM D 1238 Condition F	8.0
Linear Coefficient of Thermal Expansion, in/in/°C (-30°C to 30°C)	ASTM D 696	8.0x10 <sup>-5</sup>
<b>Miscellaneous Properties</b>		
Density, g/cm <sup>3</sup> (base resin)	ASTM D 1505	0.949
Density, g/cm <sup>3</sup> (compound)	ASTM D 1505	0.960
Hardness (Shore D)	ASTM D 2240	64
Notched Izod Impact Strength (ft-lb/in)	ASTM D 256	8
Vicat Softening Temperature (°F)	ASTM D 1525	255
Long Term Hydrostatic Strength		
@ 23°C, psi	ASTM D 2837	1,600
@ 60°C, psi	ASTM D 2837	1,000
Material Designation	PPI Recommended	PE4710
Material Cell Classification	ASTM D 3350	445576C
NuMex PE4710 is NSF Listed	Standard #14	

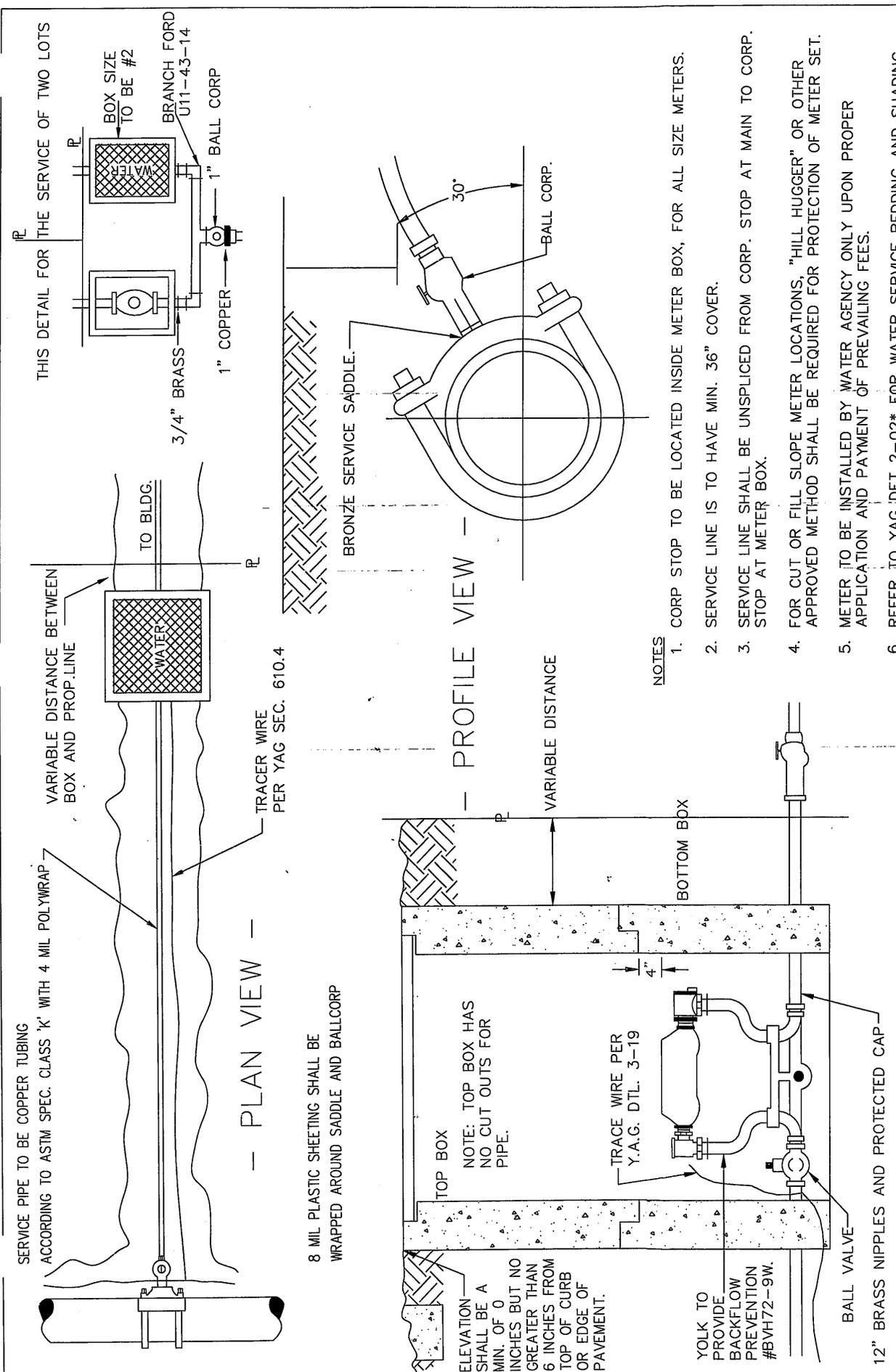
<sup>1</sup> This is a typical physical properties list representing the basic characteristics of the material and does not represent specific determinations.

### Standards and Specifications

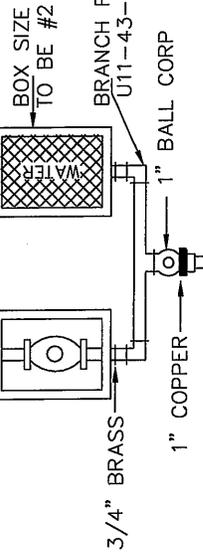
NuMex PE4710 pipe is tested and listed by the National Sanitation Foundation (NSF) and carries the NSF seal for potable water.

NuMex PE4710 pipe meets or exceeds all applicable standards including:

- NSF Standard #14
- ANSI/AWWA C901 American National Standards Institute/ American Water Works Association Standard specifications for polyethylene pressure pipe, tubing, and fittings (1/2" to 3" for water)
- ASTM D 1248 Standard specification for polyethylene plastics molding and extrusion materials
- ASTM D 3350 Standard specification for polyethylene plastics pipe and fittings material
- ASTM D 2239 Standard specification for polyethylene (PE) plastic pipe (SIDR-PR) based on controlled inside diameter
- ASTM D 3035 Standard specification for polyethylene (PE) plastic pipe (DR-PR) based on controlled outside diameter
- ASTM D 2737 Standard Specification for polyethylene (PE) plastic tubing



THIS DETAIL FOR THE SERVICE OF TWO LOTS



TRACER WIRE PER YAG SEC. 610.4

8 MIL PLASTIC SHEETING SHALL BE WRAPPED AROUND SADDLE AND BALLCORP

— PROFILE VIEW —

NOTES

1. CORP STOP TO BE LOCATED INSIDE METER BOX, FOR ALL SIZE METERS.
2. SERVICE LINE IS TO HAVE MIN. 36" COVER.
3. SERVICE LINE SHALL BE UNSPLICED FROM CORP. STOP AT MAIN TO CORP. STOP AT METER BOX.
4. FOR CUT OR FILL SLOPE METER LOCATIONS, "HILL HUGGER" OR OTHER APPROVED METHOD SHALL BE REQUIRED FOR PROTECTION OF METER SET.
5. METER TO BE INSTALLED BY WATER AGENCY ONLY UPON PROPER APPLICATION AND PAYMENT OF PREVAILING FEES.
6. REFER TO YAG DET 2-02\* FOR WATER SERVICE BEDDING AND SHADING.

DETAIL NO. <b>3-16*</b>	<b>YAG STANDARD DETAIL</b>	<b>WATER SERVICE CONNECTIONS</b>	DETAIL NO. <b>3-16*</b>
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**SPECIFICATIONS**  
Effective April 2, 2001

183C Centennial Ave.  
Hartings, NE 68901  
Ph: 402-462-2227  
Fax: 402-462-5529  
Toll Free: 866-851-2227  
centennialplastics.com

CITY OF WILLIAMS  
USES ONLY  
200 PSI  
SIDR 7

# CenFlo HDPE

## HDPE 3408 — ASTM D2239 and ASTM D2737 CTS

- Flexible polyethylene pipe and tubing
- Produced from only the finest virgin material
- Backed by a **30-YEAR WARRANTY**
- Virgin Black material

80 PSI	SIDR 19						
ASTM D2239		1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
O.D.		N/A	N/A	1.169"	1.526"	1.180"	2.250"
I.D.		N/A	N/A	1.049"	1.380"	1.610"	2.067"
Wall		N/A	N/A	.060"	.073"	.100"	.109"
Wt/ft		N/A	N/A	.093#	.148#	.277#	.324#
Coil Lengths		N/A	N/A	100-300 ft.	100-300 ft.	100-250 ft.	100-200 ft.
100 PSI	SIDR 15						
O.D.		N/A	.944"	1.189"	1.584"	1.824"	2.343"
I.D.		N/A	.824"	1.049"	1.380"	1.610"	2.067"
Wall		N/A	.060"	.070"	.092"	.107"	.138"
Wt/ft		N/A	.077#	.105#	.187#	.251#	.416#
Coil Lengths		N/A	100-400 ft.	100-300 ft.	100-300 ft.	100-250 ft.	100-200 ft.
125 PSI	SIDR 11.5						
O.D.		.742"	.968"	1.231"	1.620"	N/A	N/A
I.D.		.622"	.824"	1.049"	1.380"	N/A	N/A
Wall		.060"	.072"	.091"	.120"	N/A	N/A
Wt/ft		.057#	.090#	.143#	.246#	N/A	N/A
Coil Lengths		100-400 ft.	100-400 ft.	100-300 ft.	100-300 ft.	N/A	N/A
160 PSI	SIDR 9						
O.D.		.760"	1.008"	1.283"	1.686"	1.968"	2.527"
I.D.		.622"	.824"	1.049"	1.380"	1.610"	2.067"
Wall		.069"	.092"	.117"	.153"	.179"	.210"
Wt/ft		.066#	.116#	.186#	.320#	.430#	.710#
Coil Lengths		100-400 ft.	100-400 ft.	100-300 ft.	100-300 ft.	100-250 ft.	100-200 ft.
200 PSI*	SIDR 7						
O.D.		.800"	1.060"	1.349"	1.774"	2.070"	2.657"
I.D.		.622"	.824"	1.049"	1.380"	1.610"	2.067"
Wall		.089"	.118"	.150"	.197"	.230"	.295"
Wt/ft		.087#	.152#	.246#	.424#	.578#	.952#
Coil Lengths		100-400 ft.	100-400 ft.	100-300 ft.	100-300 ft.	100-250 ft.	100-200 ft.
200 PSI*	SDR 9						
ASTM D2737 CTS		1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
O.D.		N/A	.875"	1.125"	1.375"	1.625"	2.125"
I.D.		N/A	.681"	.875"	1.069"	1.263"	1.653"
Wall		N/A	.097"	.125"	.153"	.181"	.236"
Wt/ft		N/A	.103#	.170#	.254#	.353#	.602#
Coil Lengths		N/A	100-400 ft.	100-300 ft.	100-300 ft.	100-250 ft.	100-200 ft.

\*CenFlo 3408 SIDR 7 200 PSI pipe meets the requirements of AWWA C901

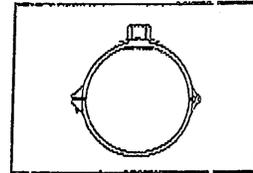
\*CenFlo 3403 CTS SIDR 7 200 PSI pipe meets the requirements of AWWA C901

Note: CenFlo HDPE SIDR 19 80 PSI, SIDR 15 100 PSI, SIDR 11.5 125 PSI and SIDR 7 200 PSI are suitable for connections with insert fittings and clamps.

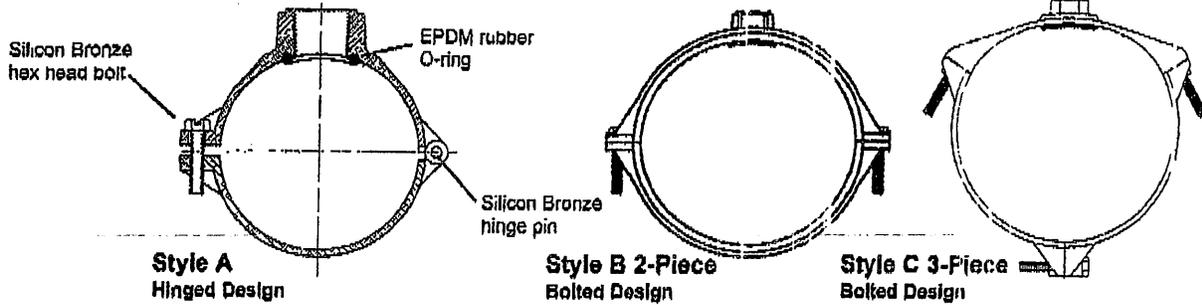
Note: CenFlo HDPE SDR 9 200 PSI is suitable for connections with CTS compression fittings.

# SUBMITTAL INFORMATION

## Brass Saddles For C900 PVC - (S91-xxx style)



### S91 BRASS SADDLES WITH IRON PIPE TAPS FOR C900 PVC PIPE



PVC PIPE SIZE	ACTUAL O.D.	TAP SIZE	APPROX. WT. LBS.	CATALOG NUMBER	STYLE	✓ SUBMITTED ITEM(S)
2"	2.50	1/2"	.9	S91-201	A	
		3/4"	1.1	S91-203	A	
		3/4"	1.8	S91-403	A	
4"	4.80	1"	2.0	S91-404	A	
		1-1/2"	6.5	S91-406	A	
		2"	6.4	S91-407	A	
		3/4"	2.6	S91-803	A	
6"	6.90	1"	2.6	S91-604	A	
		1-1/2"	8.9	S91-606	A	
		2"	7.3	S91-607	A	
		3/4"	2.8	S91-803	A	
8"	9.05	1"	3.2	S91-804	A	
		1-1/2"	8.0	S91-806	A	
		2"	8.5	S91-807	A	
		3/4"	9.3	S91-1003	B	
10"	11.10	1"	9.1	S91-1002	B	
		1-1/2"	10.6	S91-1006	C	
		2"	10.5	S91-1007	C	
		3/4"	11.1	S91-1203	B	
12"	13.20	1"	11.0	S91-1204	B	
		1-1/2"	11.5	S91-1206	C	
		2"	11.0	S91-1207	C	

### FEATURES

- All brass conforms to AWWA Standard C800 (ASTM B-62, UNS NO C83600 - 85-5-5-5)
- Style A Saddle body and strap permanently held together with silicon bronze pin for saddles sized 2" thru 8"
- Bolt is 5/16" slotted hex head silicon bronze for saddles sized 2" thru 8"
- A three-piece bolted design is used for S90 Saddles sized 10" and 12" with 1-1/2" and 2" taps, two-piece for 3/4" and 1" taps
- All 10" and 12" saddles are held together with 1/2" silicon bronze bolts (3/4" hex head).

The Ford Meter Box Company considers the information in this submittal form to be correct at the time of publication. Item and option availability, including specifications, are subject to change without notice. Please verify that your product information is current.



**The Ford Meter Box Company, Inc.**  
 P.O. Box 443, Wabash, Indiana U.S.A. 46992-0443  
 Phone: 260-563-3171 / Fax: 800-828-3487  
 Overseas Fax: 280-563-0167  
<http://www.fordmeterbox.com>

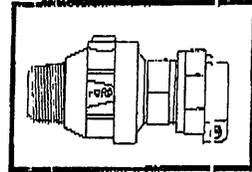
06/09/00

Submitted By

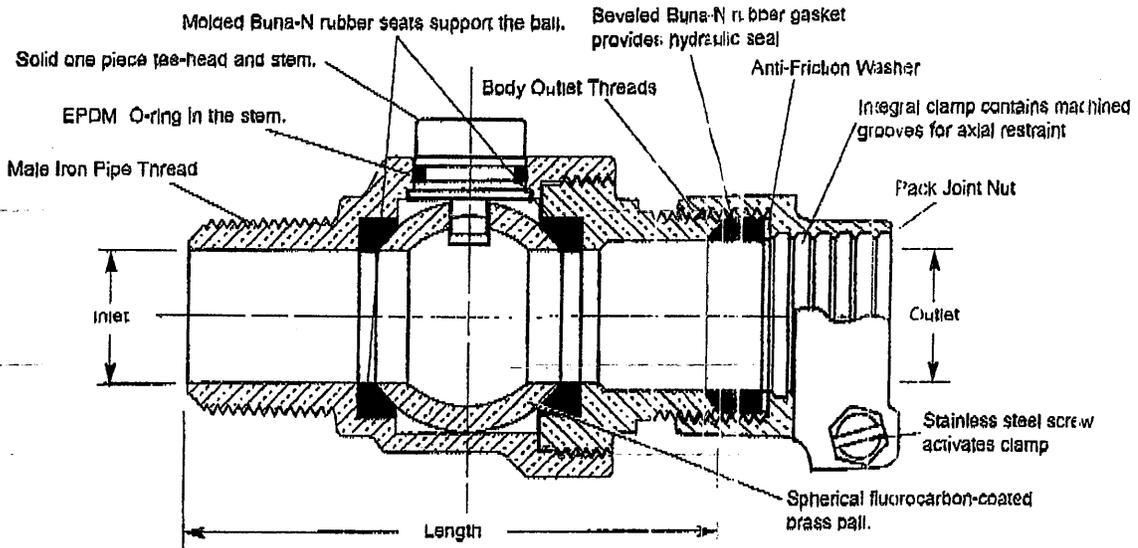
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# SUBMITTAL INFORMATION

## Ballcorp™ Corporation Stops - (FB1101-x style)



### MALE IRON PIPE THREAD INLET BY PACK JOINT FOR POLYETHYLENE PIPE (PEP) OUTLET



VALVE SIZE	INLET SIZE	OUTLET SIZE	VALVE LENGTH	BODY OUTLET THREADS	APPROX. Wt. Lbs	PART NUMBER	✓ SUBMITTED ITEM(S)
3/4"	3/4"	3/4"	4-9/16"	1" Flare Copper	2.0	FB1101-3	
1"	1"	1"	4-9/16"	1-1/4" Flare Copper	3.2	FB1101-4	
1-1/4"	1-1/4"	1-1/4"	5-7/8"	1-1/2" Flare Copper	5.3	FB1101-6	
1-1/2"	1-1/2"	1-1/2"	6-9/16"	2" Flare Copper	7.0	FB1101-6- DR7	
2"	2"	2"	7-9/16"	2" Flare Copper	11.0	FB1101-7- DR7	

### FEATURES

- All brass conforms to AWWA Standard C800 (ASTM B-62, UNS NO C83600 - 85-5-5-5)
- Ends are integral or secured with adhesive to prevent unintentional disassembly.
- 300 PSI working pressure.

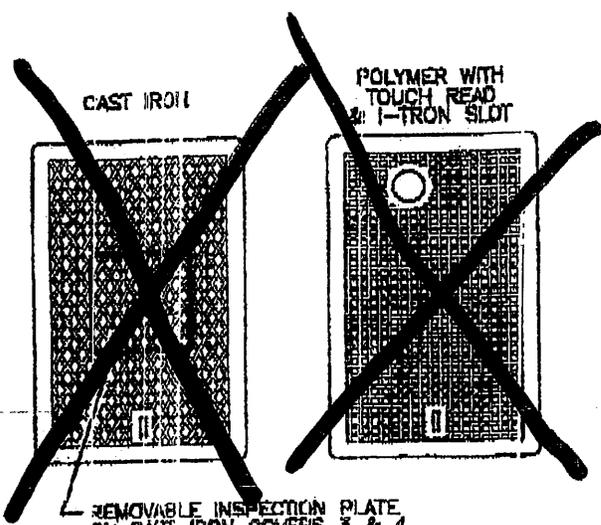
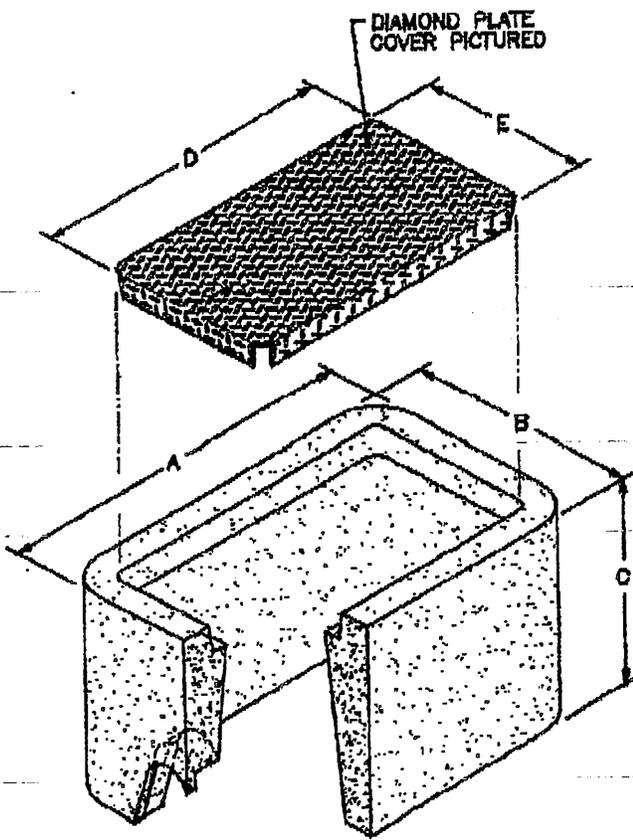
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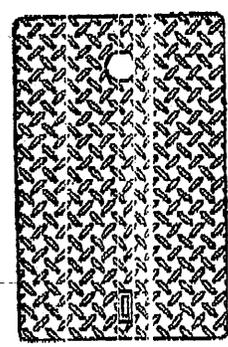
**The Ford Meter Box Company, Inc.**  
 P.O. Box 443, Wabash, Indiana U.S.A. 46992-0443  
 Phone: 260-563-3171 / Fax: 800-826-3487  
 Overseas Fax: 260-563-0167  
<http://www.fordmeterbox.com>

03/14/00

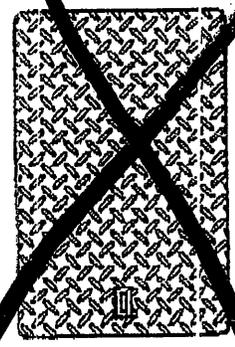
Submitted By:



DIAMOND PLATE STEEL WITH TOUCH READ



DIAMOND PLATE STEEL



BOX NO.	MAG SPEC 320 BOX DIMENSIONS			MATCHING COVERS				COVER DIMENSIONS	
	A	B	C	CAST IRON	POLYMER	DIAMOND WITH TOUCH READ & I-IRON SLOT	DIAMOND PLATE	D	E
2	24-1/2"	18-3/4"	12"	NO. 2	NO. 2	NO. 2	NO. 2	21-3/4"	14-1/8"
3	29-1/2"	18-1/2"	12"	NO. 3	N/A	NO. 3	NO. 3	28-1/4"	15-1/4"
4	33-1/2"	22-3/4"	12"	NO. 4	N/A	NO. 4	NO. 4	30"	18-1/2"

NOTES:  
HIGH DENSITY CONCRETE BOX  
CONFORMING TO MAG SPEC. 320

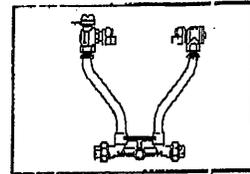
Contractors/Engineers Supply, Inc.  
Proudly Serving Our Customers Since "1976"  
5435 West Mohave Phone (602) 272-1380  
Phoenix, Arizona 85043 Fax (602) 233-2818

MAG SPEC 320  
CONCRETE METER BOX &  
COVER ASSEMBLY

DETAIL NO.

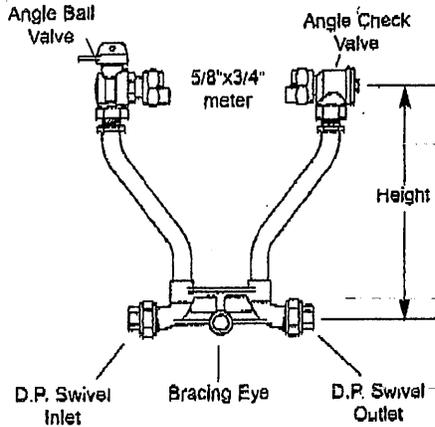
# SUBMITTAL INFORMATION

## 70 Series Coppersetter - (VBH72-xx-11-xx style)



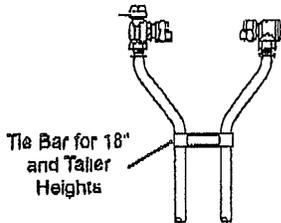
ANGLE BALL VALVE BY ANGLE CHECK VALVE (5/8" X 3/4" METER)

DOUBLE PURPOSE UNION SWIVEL INLET AND OUTLET



### Coppersetter Part Number

HEIGHT (INCHES)	APPROX. WT. LBS.	CATALOG NUMBER (INSERT SERVICE LINE CONN. SIZE)	✓ SUBMITTED ITEM(S)
7	6.0	VBH72-7W-11-xx	
9	6.2	VBH72-9W-11-xx	
12	6.4	VB-172-12W-11-xx	
15	6.6	VB-172-15W-11-xx	
18	7.3	VB-172-18W-11-xx	
21	7.5	VB-172-21W-11-xx	
24	7.8	VB-172-24W-11-xx	
27	8.0	VB-172-27W-11-xx	
30	8.3	VB-172-30W-11-xx	
33	8.6	VB-172-33W-11-xx	
36	8.8	VB-172-36W-11-xx	
39	9.1	VB-172-39W-11-xx	
42	9.4	VB-172-42W-11-xx	



### Service Line Size

INLET	OUTLET	SERVICE LINE CONN. SIZE	✓ SUBMITTED ITEM(S)
3/4" D.P. Swivel	3/4" D.P. Swivel	33	
1" D.P. Swivel	1" J.P. Swivel	44	

# VBH72-9W-81-33

### FEATURES

- All brass conforms to AWWA Standard C800 (ASTM B-62, UNS NO C83600 - 85-5-5-5)
- Saddle Nuts hold the meter in place for tightening.
- Bracing Eye is standard on all 70 Series Coppersettlers.
- Tie Bar is standard for 18" and taller Coppersetter heights (72 Series).
- Double Purpose Union Swivels will accommodate male iron pipe threads or flare copper.
- 13/16" Copper Risers provide more flow capacity.
- All Ford Setters are assembled with lead-free solder.

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<http://www.fordmeterbox.com>

09/21/00

Submitted By:

# Data Sheet

Vehicle Gateway Basestation (VGB) Model 4600

## Description

The Sensus FlexNet Vehicle Gateway Basestation (VGB) is a portable radio-based device used for the acquisition of data from utility meters and other field-based diagnostic instruments. The VGB is compact and portable, allowing it to be used in any vehicle providing 12-volt DC power. The operator simply places the unit in the vehicle cabin, loads the desired meter reading route into the laptop computer and drives along the prescribed route. Meter data is collected as the vehicle travels within proximity to the selected



Sensus' user-focused equipment and software provides utilities with tremendous meter reading efficiency, with fewer limitations compared to other types of radio-based meter reading systems. In addition, Sensus' software platforms operate with all of our reading packages, allowing utilities to transition systems without downtime for operator training.

## Features

### FLEXNET AND RADIOREAD COMPATIBILITY

The VGB Model 4600 provides the ability to read both Sensus RadioRead and FlexNet drive-by technologies. By combining these technologies, this solution allows the utility to maintain and utilize their existing RadioRead system and reading equipment while transitioning to FlexNet. Dual reading capability allows the utility to transition to the latest FlexNet technology and positions utilities to migrate to a fixed base platform in the future.<sup>1</sup>

### PORTABILITY

Through the use of advanced design, the radio electronics of the VGB are contained in a portable enclosure about the size of a small briefcase. With the addition of a laptop computer, connecting cables and antenna, the complete VGB package can be set up in any vehicle within minutes. The portable

VGB instantly turns almost any vehicle—even a compact car—into a meter reading machine.

### SYSTEM RELIABILITY

FlexNet and RadioRead+ utilize primary-use radio frequencies to communicate with SmartPoint modules. The combination of FCC-protected frequencies and shear transmission power of the SmartPoint modules ensure reliable communication from meters and ancillary devices. In addition, SmartPoint M2 and RadioRead+ modules provide infrastructure detail by monitoring their operating conditions and reporting meter tamper, continuous flow, leak detection (when equipped), high or low consumption and low battery alarms.

### OPERATION

The VGB sends an alert signal to the meter's SmartPoint module or ancillary device. Upon receipt of the alert, the SmartPoint module responds by transmitting its most

recent reading. Once received, the SmartPoint module returns to a low-power listening mode. The operator has the option of directing the VGB to signal all endpoints within range (blind reading mode), or to select endpoints (geographic reading mode).

### USER FRIENDLY SOFTWARE

The VGB utilizes AutoVu, a software program especially designed for operating Sensus drive-by meter reading equipment. AutoVu features a convenient, user-friendly pull-down menu system for directing the meter reading process. Operators are also able to input information, such as route notes, manually via the PC's keyboards. The operator can easily edit route data configurations when necessary. Back at the office, Sensus AutoRead processes the information gathered by AutoVu and provide the utility's billing software with a simple plug-and-play interface, no matter what Sensus reading system is utilized.

# Data Sheet

Vehicle Gateway Basestation (VGB) Model 4600

## Specifications

<b>SERVICE</b>	Radio-based mobile utility meter reading system
<b>PHYSICAL CHARACTERISTICS</b>	VGB in metal case with folding handle: Length 18.5" x Width 11.25" x Height 4.5". Includes laptop computer, USB cables, magnetic-mount antenna and hard shell carrying case.
<b>WEIGHT</b>	19lbs.
<b>POWER</b>	12-volt DCDC adapter through VGB (with battery back-up, computer only); 7 watts
<b>FREQUENCY RANGE</b>	900 – 950 MHz
<b>RECEIVER SENSITIVITY</b>	-119 dBm
<b>MEMORY</b>	Non-Volatile
<b>APPROVALS</b>	Licensed Operation US: FCC CFR 47, Part 24D, Part 101C, Part 15 Canada: Industry Canada (IC) RSS-134, RSS-210
<b>SOFTWARE</b>	AutoVu (3.0 or higher)



VGB Unit



Power Cord

GPS Antenna

USB Cord

Antenna



(1) A Vehicle Transceiver Unit (VXU) is required for dual reading capability.

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# AutoRead® Handheld Device / Programmer

## Standard Model - AR 5501 RadioRead™ Model - AR 5502

### APPLICATION — METER READING:

The Sensus AutoRead® Hand-Held Device [HHD] is primarily designed to collect and store utility meter readings with built-in capability for expanded uses. The HHD interfaces to a personal computer [PC] through a communications/charging stand used for uploading pre-programmed meter reading route information. The computer must be equipped with Sensus AutoRead® System software.

The Model AR-5501 accepts meter reading data entered manually on a built-in keypad, or electronically, through TouchRead® System reading guns used for interrogating encoders. Reading gun options include cable-connected and RF (no cable required) styles.

The Model AR-5502 includes all features of the Model AR-5501, plus it can read Sensus RadioRead® Meter Transceiver Units [MXUs].

### PROGRAMMING:

The AR5500 series HHDs are designed for collecting meter readings as well as programming RadioRead MXUs, FlexNet SmartPoints, and ICE registers.

### CONSTRUCTION:

The HHD is housed in a weather-resistant, high impact, UV-stabilized plastic. Surface-mounted circuitry in the specially designed, watertight case allows the HHD to be used in rugged field conditions over a wide range of temperatures.

### ERGONOMIC DESIGN:

The HHD's ergonomic-minded design offers a well-balanced, easy-to-handle unit. It includes a graphical liquid crystal display [LCD] for ease of viewing during operation. The contrast value of the LCD automatically adjusts based on the ambient temperature, but can also be easily field adjusted to compensate for use in varying lighting conditions. The HHD can be manually carried during operation, or function in the optional HHD carrier harness.

### BACKLIGHTING:

A backlight feature provides illumination to the LCD for convenience in data entry and ease of reading data in areas with insufficient lighting.



## SPECIFICATIONS

<b>PRIMARY</b>	Hand-held electronic meter reading collection and data storage device for manual, TouchRead System, and RadioRead meter reading.
<b>OPTIONAL</b>	Programmer for Sensus SmartPoints and ICE registers
<b>PHYSICAL CHARACTERISTICS</b>	Case material molded of high impact, UV-stabilized plastic. Orange color standard. Reading device/ programmer connection built in. Carrying harness included.
<b>DIMENSIONS</b>	10" [254 mm] (H) x 5.25" [133.35 mm] (W) at display and 3.1" [78.74 mm] (W) at its narrowest point x 2.75" [69.85 mm] deep and 1.5" [38.1 mm] at its shallowest
<b>WEIGHT</b>	29.5 oz (836 grams)
<b>OPERATING SYSTEM</b>	Microsoft Windows Mobile 6 Microprocessor: Intel XScale® processor, 624 MHz Operating Memory: 128 MB SDRAM Data Storage Memory: 1GB
<b>KEYPAD</b>	Alpha and numeric. Large keys can be operated while wearing gloves
<b>DISPLAY</b>	Backlit color LED screen. Will display meter reading information, route information from hand-held, and any additional system information.
<b>POWER SUPPLY</b>	Lithium Ion batteries, field replaceable battery packs maintain functionality of up to 1,500 touch type or RadioReads (AR5002 only) readings for at least 12 hours
<b>OPERATING TEMPERATURE</b>	-22° F to 130° F (-30° to 54° C)
<b>HOUSING</b>	Tested to withstand being dropped on any surface from a 4 foot height without damage. Tested to MIL-STD 810F and IP67 for waterproof, dustproof, and shockproof (drop) standards.
<b>READING COMPATIBILITY</b>	Able to read Sensus encoders, Sensus MultiRead Modules, Badger ADE and Neptune Proread (ARB VI).
<b>COMMUNICATIONS/CHARGING STAND</b>	Holds one HHD per stand. Microprocessor controlled. Load/Unload speed: 115k Baud Communications Interface: Serial RS 232C Bluetooth® Class I approved Certifications: FCC Class B, CE, Rotts Compliant, EN60950

### FLEXIBLE DATA ENTRY:

When used with a Sensus TouchRead AutoGun, the HHD automates the reading process. Reading data from Sensus and compatible absolute encoder equipped meters is obtained and stored in the HHD. Manual entries can also be made using the keypad, which features elastomeric, tactile response keys. Preprogrammed "high" and "low" range limits, calculated and passed from the utility billing software, can be sent to alert the user of possible reading errors. In addition, the Model AR 5502 provides expanded features for reading and programming Sensus RadioRead MXUs.

### CORDLESS AUTOGUN:

Used in conjunction with the AutoRead HHD, the cordless AutoGun provides the ability to perform TouchRead readings without the need for cables from the AutoGun to the AutoRead HHD. Information is stored in the AutoRead HHD through a bi-directional, low-power RF link.

### AUTOMATIC, ERROR-FREE DATA COLLECTION:

When used with a TouchRead AutoGun, the HHD collects and stores readings automatically from Sensus or compatible absolute encoders. Regardless of the route sequence programmed into memory, the HHD software identifies each meter encoder using the encoder's internal identification number. The software then searches the route program and automatically stores the meter reading in the correct customer account. When the utility's meter readers hear an audible alert tone from the HHD, it is alerting them to a special condition or hazard. They need only refer to instructions on the HHD screen on how to proceed. This process eliminates errors and increases meter reading speed.

### AUDIBLE VERIFICATION/WARNING:

The audible tone confirms completed TouchRead and RadioRead System readings or alerts the user to faulty or out-of-limit readings. Tones can also be programmed with notes to alert the meter reader to hazardous situations or to respond to field survey questions.

### COMMENTS/NOTES:

The HHD uses preprogrammed, utility-defined note codes, or free form notes [using the alpha and numeric keypad].

Meter readers can identify accounts requiring special attention, or they can note unusual conditions and account survey information.

### REPLACEABLE BATTERY:

The rechargeable, self-contained Lithium Ion battery pack is field-replaceable to minimize downtime. The HHD is also equipped with a lithium battery backup to maintain date and time.

### PRODUCTIVITY MONITORING:

The HHD's built-in clock can record the time and day of each meter reading. The software can note and store the type of reading made: manual, automatic, and/or multiple data entry. These reads provide an overview of time spent reading the route and special problems related to readings or equipment use.

### SERVICE AND WARRANTY:

No service should be necessary if reasonable care is given during normal use. Sensus offers the Sensus Equipment Maintenance Program [SEMP] to extend the protection of HHDs and related equipment beyond the one [1] year warranty covering materials and workmanship. Warranty and service policy details are available from Sensus representatives and authorized AMR distributors.

TouchRead AutoGun or AutoGun PitProbe can be used with the HHD for electronic reading of meters equipped with TouchRead System encoders: AutoGun reading gun and PitProbe extension can be used without a connecting cord.

The Sensus 5500 Series HHD provides flexibility for utilities needing a reliable electronic hand-held meter reading and programming device. In addition to accepting meter readings via its keypad, the HHD also accepts readings from TouchRead® System and RadioRead® System equipped meters where those systems are used.

# Sensus Limited Warranty

## I. General Product Coverage

Sensus USA Inc. ("Sensus") warrants its products and parts to be free from defects in material and workmanship for one (1) year from the date of Sensus shipment and as set forth below. All products are sold to customer ("Customer") pursuant to Sensus' Terms of Sale, available at: [sensus.com/TC](https://www.sensus.com/TC) ("Terms of Sale").

## II. SR II® and accuSTREAM™ 5/8", 3/4" & 1" Meters...

are warranted to perform to AWWA New Meter Accuracy Standards for five (5) years from the date of Sensus shipment or until the registration shown below, whichever occurs first. Sensus further warrants that the SR II meter will perform to at least AWWA Repaired Meter Accuracy Standards for fifteen (15) years from the date of Sensus shipment or until the registration shown below, whichever occurs first:

	New Meter Accuracy	Repair Meter Accuracy
5/8" SR II Meter and accuSTREAM Meter	500,000 gallons	1,500,000 gallons
3/4" SR II Meter and accuSTREAM Meter	750,000 gallons	2,250,000 gallons
1" SR II Meter and accuSTREAM Meter	1,000,000 gallons	3,000,000 gallons

## III. SR® 5/8", 3/4" & 1" Meters...

are warranted to perform to AWWA New Meter Accuracy Standards for one (1) year from the date of Sensus shipment. Sensus further warrants that the 5/8", 3/4" and 1" SR meter will perform to at least AWWA Repaired Meter Accuracy Standards for fifteen (15) years from the date of Sensus shipment or until the registration shown below, whichever occurs first:

	Repair Meter Accuracy
5/8" SR Meter	1,500,000 gallons
3/4" SR Meter	2,250,000 gallons
1" SR Meter	3,000,000 gallons

## IV. SR 1-1/2" & 2"...

are warranted to perform to AWWA New Meter Accuracy Standards for one (1) year from the date of Sensus shipment. Sensus further warrants that the 1-1/2" and 2" SR meter will perform to at least AWWA Repaired Meter Accuracy Standards for ten (10) years from the date of Sensus shipment or until the registration shown below, whichever occurs first:

	Repair Meter Accuracy
1-1/2" SR	5,000,000 gallons
2" SR	8,000,000 gallons

## V. PMM® 5/8", 3/4", 1" Meters...

are warranted to perform to AWWA New Meter Accuracy Standards for one (1) year from the date of Sensus shipment. Sensus further warrants that the 5/8", 3/4", and 1" PMM meter will perform to at least AWWA Repaired Meter Accuracy Standards for fifteen (15) years from the date of Sensus shipment or until the registration shown below, whichever occurs first:

	Repair Meter Accuracy
5/8" PMM	1,500,000 gallons
3/4" PMM	2,000,000 gallons
1" PMM	3,000,000 gallons

## VI. PMM 1-1/2", 2" Meters...

are warranted to perform to AWWA New Meter Accuracy Standards for one (1) year from the date of Sensus shipment. Sensus further warrants that the 1-1/2", and 2" PMM meter will perform to at least AWWA Repaired Meter Accuracy Standards for ten (10) years from the date of Sensus shipment or until the registration shown below, whichever occurs first:

	Repair Meter Accuracy
1-1/2" PMM	5,000,000 gallons
2" PMM	8,000,000 gallons

## VII. iPERL™ Water Management Systems...

that register water flow are warranted to perform to the accuracy levels set forth in the iPERL Water Management System Data Sheet available at [sensus.com/ipperl/datasheet](https://www.sensus.com/ipperl/datasheet) or by request from 1-800-METER-IT, for twenty (20) years from the date of Sensus shipment. The iPERL System warranty does not include the external housing.

## VIII. Maincase...

of the SR, SR II and PMM in both standard and low lead alloy meters are warranted to be free from defects in material and workmanship for twenty-five (25) years from the date of Sensus shipment. Composite and E-coated maincases will be free from defects in material and workmanship for fifteen (15) years from the date of Sensus shipment.

## IX. Sensus "W" Series Turbo Meters, OMNI™ Meters and Propeller Meters...

are warranted to perform to AWWA New Meter Accuracy Standards for one (1) year from the date of Sensus shipment.

## X. Sensus accuMAG™ Meters...

are warranted to be free from defects in material and workmanship, under normal use and service, for 18 months from the date of Sensus shipment or 12 months from startup, whichever occurs first.

## XI. Sensus Registers...

are warranted to be free from defects in material and workmanship from the date of Sensus shipment for the periods stated below or until the applicable registration for AWWA Repaired Meter Accuracy Standards, as set forth above, are surpassed, whichever occurs first:

5/8" thru 2" SR, SR II, PMM, accuSTREAM Standard Registers	25 years
5/8" thru 2" SR, SR II, PMM, accuSTREAM Encoder Registers	10 years
Electronic Communication Index (ECI)	10 years
All HSPU, IMP Contactor, R.E.R. Elec. ROFI	1 year
Standard and Encoder Registers for:"W" Turbo and Propeller Meters	1 year
OMNI Register with Battery	10 years

## XII. Sensus Electric Meters...

are warranted to be free from defects in material and workmanship for one (1) year from the date of Sensus shipment. Spare parts and components are warranted to be free from defects in material and workmanship for one (1) year from the date of Sensus shipment.

Repaired or refurbished equipment repaired by Sensus is warranted to be free from defects in material and workmanship for ninety (90) days from the date of Sensus shipment or for the time remaining on the original warranty period, whichever is longer.

## XIII. Batteries, iPERL System Components, AMR and FlexNet™ System AMI Interface Devices...

are warranted to be free from defects in material and workmanship from the date of Sensus shipment for the period stated below:

Electronic TouchPad	10 years
RadioRead® MXU (Model 505C, 510R or 520R) and Batteries	20 years*
Act-Pak® Instrumentation	1 year
TouchRead® Coupler and AMR Equipment	1 year
FlexNet Water or Gas SmartPoint™ Modules and Batteries	20 years*
Hand Held Device	1 year
Vehicle Gateway Base Station	1 year
FlexNet Base Station (including the Metro and M400 base stations)	1 year
Echo Transceiver	1 year
Remote Transceiver	1 year
iConA and FlexNet Electricity SmartPoint Module	1 year
iPERL System Battery and iPERL System Components	20 years*
Residential Electronic Register	20 years*

\* Sensus will repair or replace non-performing:

- RadioRead® MXU (Model 505C, 510R and 520R) and Batteries,
- FlexNet Water or Gas SmartPoint Modules (configured to the factory setting of six transmissions per day under normal system operation of up to one demand read to each SmartPoint Module per month and up to two firmware downloads during the life of the product) and batteries,
- Residential Electronic Register with hourly reads, and
- iPERL System Batteries, and/or the iPERL System flowtube, the flow sensing and data processing assemblies, and the register ("iPERL System Components") with hourly reads

at no cost for the first ten (10) years from the date of Sensus shipment, and for the remaining ten (10) years, at a prorated percentage, applied towards the published list prices in effect for the year product is accepted by Sensus under warranty conditions according to the following schedule:

Years	Replacement Price	Years	Replacement Price
1 – 10	0%	16	55%
11	30%	17	60%
12	35%	18	65%
13	40%	19	70%
14	45%	20	75%
15	50%	>20	100%

Note: Software supplied and licensed by Sensus is warranted according to the terms of the applicable software license agreement. Sensus warrants that network and monitoring services shall be performed in a professional and workmanlike manner.

## XIV. Return...

Sensus' obligation, and Customer's exclusive remedy, under this Sensus Limited Warranty is, at Sensus' option, to either (i) repair or replace the product, provided the Customer (a) returns the product to the location designated by Sensus within the warranty period; and (b) prepaays the freight costs both to and from such location; or (ii) deliver replacement components to the Customer, provided the Customer installs, at its cost, such components in or on the product (as instructed by Sensus), provided, that if Sensus requests, the Customer (a) returns the product to the location designated by Sensus within the warranty period; and (b) prepaays the freight costs both to and from such location. In all cases, if Customer does not return the product within the time period designated by Sensus, Sensus will invoice, and Customer will pay within thirty days of the invoice date, for the cost of the replacement product and/or components.

The return of products for warranty claims must follow Sensus' Returned Materials Authorization (RMA) procedures. Water meter returns must include documentation of the

Customer's test results. Test results must be obtained according to AWWA standards and must specify the meter serial number. The test results will not be valid if the meter is found to contain foreign materials. If Customer chooses not to test a Sensus water meter prior to returning it to Sensus, Sensus will repair or replace the meter, at Sensus' option, after the meter has been tested by Sensus. The Customer will be charged Sensus' then current testing fee. Sensus SmartPoints modules and MXU's returned must be affixed with a completed return evaluation label. For all returns, Sensus reserves the right to request meter reading records by serial number to validate warranty claims.

For products that have become discontinued or obsolete ("Obsolete Product"), Sensus may, at its discretion, replace such Obsolete Product with a different product model ("New Product"), provided that the New Product has substantially similar features as the Obsolete Product. The New Product shall be warranted as set forth in this Sensus Limited Warranty.

THIS SECTION XIV SETS FORTH CUSTOMER'S SOLE REMEDY FOR THE FAILURE OF THE PRODUCTS, SERVICES OR LICENSED SOFTWARE TO CONFORM TO THEIR RESPECTIVE WARRANTIES.

#### **XV. Warranty Exceptions and No Implied Warranties...**

This Sensus Limited Warranty does not include costs for removal or installation of products, or costs for replacement labor or materials, which are the responsibility of the Customer. The warranties in this Sensus Limited Warranty do not apply to goods that have been: installed improperly or in non-recommended installations; installed to a socket that is not functional, or is not in safe operating condition, or is damaged, or is in need of repair; tampered with; modified or repaired with parts or assemblies not certified in writing by Sensus, including without limitation, communication parts and assemblies; improperly modified or repaired (including as a result of modifications required by Sensus); converted; altered; damaged; read by equipment not approved by Sensus; for water meters, used with substances other than water, used with non-potable water, or used with water that contains dirt, debris, deposits, or other impurities; subjected to misuse, improper storage, improper care, improper maintenance, or improper periodic testing (collectively, "Exceptions"). If Sensus identifies any Exceptions during examination, troubleshooting or performing any type of support on behalf of Customer, then Customer shall pay for and/or reimburse Sensus for all expenses incurred by Sensus in examining, troubleshooting, performing support activities, repairing or replacing any Equipment that satisfies any of the Exceptions defined above. The above warranties do not apply in the event of Force Majeure, as defined in the Terms of Sale.

**THE WARRANTIES SET FORTH IN THIS SENSUS LIMITED WARRANTY ARE THE ONLY WARRANTIES GIVEN WITH RESPECT TO THE GOODS, SOFTWARE LICENSES AND SERVICES SOLD OR OTHERWISE PROVIDED BY SENSUS. SENSUS EXPRESSLY DISCLAIMS ANY AND ALL OTHER REPRESENTATIONS, WARRANTIES, CONDITIONS, EXPRESSED, IMPLIED, STATUTORY OR OTHERWISE, REGARDING ANY MATTER IN CONNECTION WITH THIS SENSUS LIMITED WARRANTY OR WITH THE TERMS OF SALE, INCLUDING WITHOUT LIMITATION, WARRANTIES AS TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, NON-INFRINGEMENT AND TITLE.**

**SENSUS ASSUMES NO LIABILITY FOR COSTS OR EXPENSES ASSOCIATED WITH LOST REVENUE OR WITH THE REMOVAL OR INSTALLATION OF EQUIPMENT. THE FOREGOING REMEDIES ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES FOR THE FAILURE OF EQUIPMENT, LICENSED SOFTWARE OR SERVICES TO CONFORM TO THEIR RESPECTIVE WARRANTIES.**

#### **XVI. Limitation of Liability...**

SENSUS' AGGREGATE LIABILITY IN ANY AND ALL CAUSES OF ACTION ARISING UNDER, OUT OF OR IN RELATION TO THIS AGREEMENT, ITS NEGOTIATION, PERFORMANCE, BREACH OR TERMINATION (COLLECTIVELY "CAUSES OF ACTION") SHALL NOT EXCEED THE TOTAL AMOUNT PAID BY CUSTOMER TO SENSUS UNDER THIS AGREEMENT. THIS IS SO WHETHER THE CAUSES OF ACTION ARE IN TORT, INCLUDING, WITHOUT LIMITATION, NEGLIGENCE OR STRICT LIABILITY, IN CONTRACT, UNDER STATUTE OR OTHERWISE.

AS A SEPARATE AND INDEPENDENT LIMITATION ON LIABILITY, SENSUS' LIABILITY SHALL BE LIMITED TO DIRECT DAMAGES. SENSUS SHALL NOT BE LIABLE FOR: (I) ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES; NOR (II) ANY REVENUE OR PROFITS LOST BY CUSTOMER OR ITS AFFILIATES FROM ANY END USER(S), IRRESPECTIVE OF WHETHER SUCH LOST REVENUE OR PROFITS IS CATEGORIZED AS DIRECT DAMAGES OR OTHERWISE; NOR (III) ANY IN/OUT COSTS; NOR (IV) MANUAL METER READ COSTS AND EXPENSES; NOR (V) DAMAGES ARISING FROM MAINCASE OR BOTTOM PLATE BREAKAGE CAUSED BY FREEZING TEMPERATURES, WATER HAMMER CONDITIONS, OR EXCESSIVE WATER PRESSURE. "IN/OUT COSTS" MEANS ANY COSTS AND EXPENSES INCURRED BY CUSTOMER IN TRANSPORTING GOODS BETWEEN ITS WAREHOUSE AND ITS END USER'S PREMISES AND ANY COSTS AND EXPENSES INCURRED BY CUSTOMER IN INSTALLING, UNINSTALLING AND REMOVING GOODS. "END USER" MEANS ANY END USER OF ELECTRICITY/WATER/GAS THAT PAYS CUSTOMER FOR THE CONSUMPTION OF ELECTRICITY/WATER/GAS, AS APPLICABLE.

The limitations on liability set forth in this Agreement are fundamental inducements to Sensus entering into this Agreement. They apply unconditionally and in all respects. They are to be interpreted broadly so as to give Sensus the maximum protection permitted under law.

To the maximum extent permitted by law, no Cause of Action may be instituted by Customer against Sensus more than TWELVE (12) MONTHS after the Cause of Action first arose. In the calculation of any damages in any Cause of Action, no damages incurred more than TWELVE (12) MONTHS prior to the filing of the Cause of Action shall be recoverable.

## Exhibit B

**Water Infrastructure Finance Authority of Arizona  
Clean Water Revolving Fund  
Drinking Water Revolving Fund**

**CONTRACT PACKET for Governmental Borrowers**

*This packet lists required contract conditions that apply to all Clean Water and Drinking Water Revolving Fund projects and contains forms that must be used in the procurement process. Please review this packet prior to bidding.*

**PLEASE NOTE**

- **This packet, in its entirety, must be physically included in all bidding, solicitation and contract documents.**
- Use of American Iron and Steel (AIS) applies to this project.:
  - AIS includes the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.
- Federal Davis-Bacon prevailing wages apply to this project.
  - Payment of the wages, fringe benefits and overtime rates is required.
  - The appropriate Federal (Davis-Bacon) Prevailing Wage Decision must be physically incorporated into the bidding and contract documents.
  - The construction category of Heavy (excluding dam construction) should typically be applied to all projects funded by WIFA. If you believe that a different category of wages, such as Building, should be applied to your project or portions of your project, please contact WIFA in advance.
  - Weekly certified payroll submittal is required under the Federal Davis-Bacon laws.
- Compliance with the Civil Rights Act and Equal Employment Opportunity is required.
- Promotion of Small, Minority and Women-owned Businesses and participation in EPA's Disadvantaged Business Enterprise (DBE) Program is required.

**Water Infrastructure Finance Authority of Arizona**  
**Clean Water Revolving Fund**  
**Drinking Water Revolving Fund**

**Required Contract Conditions**

This project is being financed in whole or in part by the Water Infrastructure Finance Authority of Arizona through the Clean Water or Drinking Water Revolving Fund. The loan recipient is required to comply with the following federal and state laws, rules and regulations and must ensure that their contractor(s) also comply(ies) with these regulations, laws and rules.

1. (i) Title VI of the Civil Rights Act of 1964 (Pub. L. 88-352, 42 U.S.C. Sec. 2000d), (ii) the Rehabilitation Act of 1973 (Pub. L. 93-1123, 87 Stat. 355, 29 U.S.C. Sec. 794), (iii) the Age Discrimination Act of 1975 (Pub. L. 94-135 Sec. 303, 89 Stat. 713, 728, 42 U.S.C. Sec. 6102), (iv) Section 13 of the Federal Water Pollution Control Act (Pub. L. 92-500, 33 U.S.C. Sec. 1251), and subsequent regulations, ensures access to facilities or programs regardless of race, color, national origin, sex, age or handicap.
2. Equal Employment Opportunity (Executive Order 11246, as amended by Executive Orders 11375 and 12086 and subsequent regulations). Prohibits employment discrimination on the basis of race, color, religion, sex or national origin. Inclusion of the seven clauses in Section 202 of Executive Order 11246 as amended by Executive Orders 11375 and 12086 are required in all project related contracts and subcontracts over \$10,000.
3. (i) Promoting the use of Small, Minority, and Women-owned Businesses (Executive Orders 11625, 12138 and 12432), (ii) Small Businesses Reauthorization & Amendment Act of 1988 (Section 129 of Pub. L. 100-590), (iii) Department of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 1993 (Pub. L. 102-389, 42 U.S.C. Sec. 437d), and (iv) Title X of the Clean Air Acts Amendments of 1990 (Pub. L. 101-549, 42 U.S.C. Sec. 7601 note) (“EPA’s 10% statute”). Encourages recipients to award construction, supply and professional service contracts to minority and women’s business enterprises (MBE/WBE) and small businesses and requires recipients to utilize affirmative steps in procurement.
4. Participation by Disadvantaged Business Enterprises in Procurement under Environmental Protection Agency (EPA) Financial Assistance Agreements (40 C.F.R. Part 33).
5. Debarment and Suspension (Executive Order 12549). Prohibits entering into contracts or sub-contracts with individuals or businesses who are debarred or suspended. Borrowers are required to check the status of all contractors (construction and professional services) and must require contractors to check the status of subcontractors for contracts expected to be equal to or over \$25,000 via this Internet address: [www.sam.gov/portal/public/SAM](http://www.sam.gov/portal/public/SAM).

6. E-Verify (A.R.S. § 41-4401). A governmental entity shall not award a contract to any contractor or subcontractor that fails to comply with A.R.S. § 23-214(A). Every government entity shall (i) ensure that every government entity contractor and subcontractor complies with the federal immigration laws and regulations that relate to their employees and A.R.S. § 23-214(A); (ii) require that every government entity contract include the required provisions listed under A.R.S. § 41-4401(A); and (iii) establish procedures to conduct random verification of the employment records of government entity contractors and subcontractors.

**Water Infrastructure Finance Authority of Arizona  
Clean Water Revolving Fund  
Drinking Water Revolving Fund**

**Use of American Iron and Steel**

**Public Law 113-76, enacted January 17, 2014**

SEC. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j-12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the “Administrator”) finds that—

- (1) applying subsection (a) would be inconsistent with the public interest;
- (2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
- (3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds (CWSRF and DWSRF) for carrying out the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency’s capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

## **Highlights from EPA Guidance on Use of American Iron and Steel**

Complete document available at [http://water.epa.gov/grants\\_funding/aisrequirement.cfm](http://water.epa.gov/grants_funding/aisrequirement.cfm)

### **What is considered American Iron and Steel?**

#### **What is an iron or steel product?**

For purposes of the CWSRF and DWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the public water system or treatment works: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

#### **What is a ‘construction material’ for purposes of the AIS requirement?**

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered “structural steel”. This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

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### **What is NOT considered American Iron and Steel?**

#### **What is NOT considered a ‘construction material’ for purposes of the AIS requirement?**

Mechanical and electrical components, equipment and systems are NOT considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system. The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

**Water Infrastructure Finance Authority of Arizona**  
**Clean Water Revolving Fund**  
**Drinking Water Revolving Fund**

**Use of American Iron and Steel - De Minimis Waiver**

Every water infrastructure project involves the use of thousands of miscellaneous, generally low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. For many of these incidental components, the country of manufacture and the availability of alternatives is not always readily or reasonably identifiable prior to procurement in the normal course of business; for other incidental components, the county of manufacture may be known but the miscellaneous character in conjunction with the low cost, individually and (in total) as typically procured in bulk, mark them as properly incidental.

Examples of incidental components could include small washers, screws, fasteners (i.e., nuts and bolts), miscellaneous wire, corner bead, ancillary tube, etc.

Example of items that are clearly not incidental include significant process fittings (i.e., tees, elbows, flanges, and brackets), distribution system fittings and valves, force main valves, pipes for sewer collection and/or water distribution, treatment and storage tanks, large structural support structures, etc.

EPA has established a public interest waiver for de minimis incidental components. This action permits the use of products when they occur in de minimis incidental components of such projects.

- Funds used for such de minimis incidental components cumulatively may comprise no more than a total of 5% of the total cost of the materials used in and incorporated into a project.
- The cost of an individual item may not exceed 1% of the total cost of the materials used in and incorporated into a project.

Assistance recipients who wish to use this waiver should in consultation with their contractors determine the items to be covered by this waiver and must retain relevant documentation (i.e., invoices) as to those items in their project files.

**Water Infrastructure Finance Authority of Arizona  
Clean Water Revolving Fund  
Drinking Water Revolving Fund**

**Davis-Bacon Contract Conditions (Federal Prevailing Wages)**

**PLEASE NOTE:** Federal Davis-Bacon prevailing wages apply to this project. Payment of the wages, fringe benefits and overtime rates is required.

The “subrecipient” referred to throughout the Davis-Bacon contract conditions is the WIFA Borrower.

“WIFA” is the Water Infrastructure Finance Authority of Arizona, State Capitalization Grant recipient, recipient, or the Authority.

## **Wage Rate Requirements (Also referred to as Attachment 6)**

### **Preamble**

With respect to the Clean Water and Drinking Water State Revolving Funds, EPA provides capitalization grants to each State which in turn provides subgrants or loans to eligible entities within the State. Although EPA and the State remain responsible for ensuring subrecipients' compliance with the wage rate requirements set forth herein, those subrecipients shall have the primary responsibility to maintain payroll records as described in Section 3(3)(ii)(A) below and for compliance as described in Section 5.

### **Requirements for Subrecipients That Are Governmental Entities:**

The following terms and conditions specify how recipients will assist EPA in meeting its Davis-Bacon (DB) responsibilities with respect to State recipients and subrecipients that are governmental entities. If a subrecipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient. If a State recipient needs guidance, the recipient will contact EPA. The recipient or subrecipient may also obtain additional guidance from DOL's web site at <http://www.dol.gov/whd/recovery/index.htm>.

### **1. Applicability of the Davis-Bacon prevailing wage requirements.**

Davis-Bacon prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a Clean Water Revolving Fund and to any construction project carried out in whole or in part by assistance made available by a Drinking Water Revolving Fund. If a subrecipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the subrecipient must discuss the situation with the State recipient before authorizing work on that site.

### **2. Obtaining Wage Determinations.**

(a) Subrecipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

(i) While the solicitation remains open, the subrecipient shall monitor [www.wdol.gov](http://www.wdol.gov) weekly to ensure that the wage determination contained in the solicitation remains current. The subrecipient shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination 10 days or less prior to the closing date, the subrecipient may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the subrecipient.

(ii) If the subrecipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage

determination contained in the solicitation shall be effective unless the State recipient, at the request of the subrecipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The subrecipient shall monitor [www.wdol.gov](http://www.wdol.gov) on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(b) If the subrecipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the subrecipient shall insert the appropriate DOL wage determination from [www.wdol.gov](http://www.wdol.gov) into the ordering instrument. Typically, the appropriate wage determination would be the one in effect on the date the task order, work assignment or similar instrument is awarded.

(c) Subrecipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a subrecipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the subrecipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the subrecipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The subrecipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

### **3. Contract and Subcontract provisions.**

The recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in 29 CFR § 5.1, the following clauses:

#### **(1) Minimum wages.**

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, [www.dol.gov](http://www.dol.gov).

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient(s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of

all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the recipient may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the

contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the subgrant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at [www.dol.gov/whd/forms/wh347instr.htm](http://www.dol.gov/whd/forms/wh347instr.htm) or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance” required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### (4) Apprentices and trainees -

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the Apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency

recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may be appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and subrecipient(s), the State recipient, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

#### **4. Contract Provision for Contracts in Excess of \$100,000.**

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3 above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of 40 hours in such workweek unless such

laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The subrecipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.

(b) In addition to the clauses contained in Item 3 above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the subrecipient shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the recipient and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

## **5. Compliance Verification**

(a) The subrecipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The subrecipient must use WIFA's interview form, Department of Labor's Standard Form 1445, or equivalent documentation to memorialize the interviews. WIFA's interview form and instructions are included with this packet.

(b) The subrecipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Subrecipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB. Subrecipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

(c) The subrecipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The subrecipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the subrecipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Subrecipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the subrecipient shall verify evidence of fringe benefit plans and payments thereunder by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The subrecipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Subrecipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed below and to the appropriate DOL Wage and Hour District Office listed at [www.dol.gov/whd](http://www.dol.gov/whd).

**Joe Ochab, EPA Region 9, 75 Hawthorne St. (P-22), San Francisco, CA 94105**

**Clean Water Revolving Fund  
Drinking Water Revolving Fund**

**Equal Employment**

Inclusion of these seven clauses (excerpt from Executive Order No. 11246, Section 202 as amended by Executive Order 11375 and 12086) is required in all CWRP and DWRP project related contracts and subcontracts over \$10,000:

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or worker's representative of the contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor will comply with all provisions of Executive Order No. 11246 of Sept. 24, 1965, and all of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The contractor will furnish all information and reports required by Executive Order No. 11246 of Sept. 24, 1965, and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be cancelled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in

Executive Order No. 11246 of Sept. 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of Sept. 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of Sept. 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

**Water Infrastructure Finance Authority of Arizona  
Clean Water Revolving Fund  
Drinking Water Revolving Fund**

**Disadvantaged Business Enterprises (DBE)**

**Good Faith Efforts**

Borrowers and their prime contractors must follow, document, and maintain documentation of their good faith efforts as listed below to ensure that Certified Disadvantaged Business Enterprises\* (DBEs) have the opportunity to participate in the project by increasing DBE awareness of procurement efforts and outreach.

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities; including placing DBEs on solicitation lists and soliciting them whenever they are potential sources.
2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitation for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
3. Consider in the contracting process whether firms competing for large contracts could be subcontracted with DBEs. This will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
5. Use the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U. S. Department of Commerce.
6. If the prime contractor awards subcontracts, require the prime contractor to take the steps in numbers 1 through 5 above.

**Required Contract Conditions**

These conditions must be included in all procurement contracts entered into by the Borrower for all DWRP and CWRP projects:

1. The prime contractor must pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the owner.
2. The prime contractor must notify the owner in writing prior to the termination of any Disadvantaged Business Enterprise subcontractor for convenience by the prime contractor.
3. If a Disadvantaged Business Enterprise contractor fails to complete work under the subcontract for any reason, the prime contractor must employ the six good faith efforts if soliciting a replacement contractor.
4. The prime contractor must continue to employ the six good faith efforts even if the prime contractor has achieved its fair share objectives.

5. The prime contractor must provide EPA Form 6100-2 DBE Program Subcontractor Participation Form\*\* to all of its Disadvantaged Business Enterprise subcontractors. Disadvantaged Business Enterprise subcontractors may send completed Form 6100-2 directly to the Region 9 DBE Coordinator listed below:

**Joe Ochab, EPA Region 9, 75 Hawthorne St. (P-22), San Francisco, CA 94105**

6. The prime contractor must have its Disadvantaged Business Enterprise subcontractors complete EPA Form 6100-3 - DBE Program Subcontractor Performance Form\*\*. The prime contractor must include all completed forms as part of the prime contractor's bid or proposal package to the Borrower.
7. The prime contractor must complete and submit EPA Form 6100-4 DBE Program Subcontractor Utilization Form\*\* as part of the prime contractor's bid or proposal package to the Borrower.
8. A Borrower must ensure that each procurement contract it awards contains the following terms and conditions:

The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

*\* A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.*

*\*\* DBE forms can be downloaded from [http://www.epa.gov/osbp/dbe\\_fair.htm](http://www.epa.gov/osbp/dbe_fair.htm)*

## ATTACHMENTS

### DBE Forms

[http://www.epa.gov/osbp/dbe\\_fair.htm](http://www.epa.gov/osbp/dbe_fair.htm)

6100-2 - DBE Program Subcontractor Participation Form

6100-3 - DBE Program Subcontractor Performance Form

6100-4 - DBE Program Subcontractor Utilization Form

### Davis-Bacon Forms

WH-1321 - Davis-Bacon poster

WH-347 - Payroll and certification form

SF1444 - Wage Determination Request form

Employee Interview form

### American Iron and Steel

Sample Step Certification Letter (Processed/Manufactured)

Sample Step Certification Letter (Shipped/Provided)

General Decision Number: AZ140012 06/20/2014 AZ12

Superseded General Decision Number: AZ20130012

State: Arizona

Construction Type: Residential

Counties: Coconino and Yavapai Counties in Arizona.

EXCLUDING NAVAJO INDIAN RESERVATION

RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories).

Modification Number	Publication Date
0	01/03/2014
1	01/17/2014
2	02/14/2014
3	02/21/2014
4	03/21/2014
5	04/25/2014
6	06/20/2014

BRAZ0003-007 07/01/2013

	Rates	Fringes
BRICKLAYER.....	\$ 16.44	6.31

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 ELEC0518-002 01/01/2014

	Rates	Fringes
ELECTRICIAN.....	\$ 17.50	5.26+3%

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 \* ENGI0428-005 06/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR.....	\$ 26.44	9.30

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 IRON0075-008 01/01/2014

Rates Fringes

IRONWORKER, STRUCTURAL.....	\$ 26.52	21.02
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 PLAS0394-006 07/01/2013

Rates

Fringes

CEMENT MASON/CONCRETE FINISHER...	\$ 22.84	8.57
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 SUAZ2011-005 07/28/2011

Rates

Fringes

CARPENTER, Excludes Drywall Hanging.....	\$ 18.16	0.00
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FORM WORKER.....	\$ 14.37	0.00
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HVAC MECHANIC (Installation of HVAC Duct).....	\$ 14.13	0.00
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LABORER: Common or General.....	\$ 10.20	0.00
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LABORER: Mason Tender - Brick...	\$ 12.77	0.00
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LABORER: Mason Tender - Cement/Concrete/Stone.....	\$ 11.00	0.00
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LABORER: Pipelayer.....	\$ 13.00	0.00
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OPERATOR: Backhoe.....	\$ 18.29	0.00
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OPERATOR: Excavator.....	\$ 24.67	0.00
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OPERATOR: Forklift.....	\$ 16.00	0.00
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OPERATOR: Loader (Front End)....	\$ 15.00	0.00
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OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 20.75	0.00
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OPERATOR: Roller.....	\$ 16.24	1.42
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OPERATOR: Scraper.....	\$ 19.20	1.52
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OPERATOR: Tractor.....	\$ 20.98	0.00
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PAINTER: Brush, Roller and Spray.....	\$ 13.31	0.00
PLUMBER.....	\$ 20.14	4.08
ROOFER.....	\$ 13.67	0.00
TRUCK DRIVER: Dump Truck.....	\$ 17.02	0.00
TRUCK DRIVER: Water Truck.....	\$ 14.50	0.00

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable , i.e., Plumbers Local 0198. The next number, 005 in the example, is

an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

#### Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests

for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION