

## FY 2021/2022 ASPA SAFE DRINKING WATER INFRASTRUCTURE CAPITAL IMPROVEMENT PROJECT RANKING

Project Name	Justification	Description of Project Scope	Orig Est. Cost	Criteria Points		TOTAL	RANK
				1	2		
Fagaima Well Field Filtration System (WFFS)	Fagaima Wells have been determined GUDI by USEPA. Recent studies by the University of Hawaii showed that the entire Fagaima Well Field is GUDI. Plans of drilling new wells with proper seals or rehabilitating existing wells in this area are no longer feasible. This is ASPA's highest producing well field and a filtration system is needed in order to meet EPA requirements of GUDI water. Efforts on reducing NRW down to 30% in order to lift the BWN have not been successful due to too many leaking old pipes in the system. Old pipes need to be replaced in order to reduce the water loss in the system. It will take at least another 10 years for ASPA to replace over 32 miles of AC pipe and over 150 miles of PE pipe in the system in order to reduce NRW from the current 60% to below 20%. In the meantime the long standing Boil Water Notice due to these GUDI wells remain in effect unless another option like filtration is used. ASPA aims to lift the BWN from the entire system by the end of 2022. This can only be done if the Fagaima Wells are filtered through an EPA approved filtration system.	This system will use micron filtration housings that in total can filter up to 2,400GPM with no minimum required GPM. The housings are stainless steel and each unit has 8 filters inside, each filter capacity is 100GPM. Using 3 separate housings all manifold together, we can filter 2,400gpm. We would have one series of filter housings (3) as a pre filter system and the downstream filter set (3) would be the main filters. One main water line would enter the treatment plant and one main water line would exit the treatment plant. Piping to the filtration housings would be a system of manifolding. Each filter housing can be isolated with a valve for cleaning and repair. The plant can still run with one filter housing down, just at the reduced rate of 1,600GPM. One of the main reasons for shutting down a housing would be to replace or wash filters. Any of the micron filters 5 micron or above are washable and reusable. The filters themselves are changeable. This filtration system uses no electricity and needs no backwashing. The only electricity needed will be for the booster pump and VFD leading into the plant and the booster/VFD feeding the water into the main line. No backwashing required, the filters are hand washed with a hose. The individual filters are not very large and are manageable with one person. Some larger particulates will collect on the bottom of the filter housings and these can be release by opening the bottom drain hole and draining into a bucket.	\$1.70	65	35	100	1
AC Pipe Replacement	Old AC Pipes are leaking at joints contributing to high water losses in the system. These need to be replaced by either sliplining existing AC pipes or installing new PVC pipes for distribution and sliplining these AC pipes for transmission only. There are approximately 32 miles of AC pipes in the system. The goal is to replace 10% per year and have them all replaced over the next 10 years based on funding availability.	Currently these AC pipes are the only pipes distributing water to these areas. It is not feasible to slipline these lines due to this, so it is proposed that new PVC lines will be installed and transfer all old customers to the new line, then slipline the old AC pipe for use as a Transmission line from Well to storage before distributing to system. (ASPA is currently working on completing an Asset Management Plan to identify critical areas and prioritize the locations of AC pipes to replace. The list is currently available at ASPA and this project will be broken down into the top 10 projects on the next PPL when the Asset Management Plan is completed.)	\$40.00	60	25	85	2
Significant Water Loss in Distribution System Mains and Low Pressure	This project will insure the leaks are located and repaired and recorded (as-builts). And if required replace the aging AC pipes. The Project will also improve the water pressure and assured protection of drinking water from contaminants intrusion into system and sustain safe, quality drinking water for the community as well as staying in compliance with requirements by AS-EPA/US-EPA-SDWA.	Conduct water audit, identify and reduce hydraulic district to smaller manageable district for purpose of gathering near accurate comparison of flow verses consumptions within each districts. Conduct leak detection training and on any new equipment as well as determining replacing of existing aging AC pipes.	\$2.75	50	30	80	3
Central Water System New Well Drilling & Connections	This project will augment the production of the CWS to replace GUDI wells and high Salinity Wells. This also includes exploratory wells with directional drilling at higher elevation areas. This project includes projects for both Tutuila/Aunuu & Manua. The steep terrain and complex geology of American Samoa makes it hard to drill vertically for water wells in many areas e.g. East Bay areas and some of the Central areas and Manua Islands. This project aims to explore and drill directionally for dike impounded water.	Drill exploratory wells in CWS based on recommendation by the Water & Well Systems Engineer. If the wells are productive, install pumps and controls with pump houses and a disinfection system. Install 6", etc Ø PVC pipes, valves and other appurtenant worksincluding a single Cl disinfection system with Cl analyzer and SCADA output for dosage and flow. Install connections to system.	\$10.00	53	26	79	4
HDPE Pipe Replacement - Tualauta Area	Existing HDPE service laterals were first installed back in 1998 (less than 20 yrs ago), research has shown and several USA water utilities have experienced the Oxidation Reduction Potential of PE pipes with chlorinated water. They as well as ASPA are suffering from multiple breaks in the PE pipes due to this oxidation degradation issue. The United Facilities Guide Specifications recently revised their Specifications to state that "PE pipe is not allowed for potable water distribution line". ASPA repairs over 200 leaks per month on the PE laterals. These repairs are costing ASPA more than \$100,000 each month. The HDPE manufacturer offered a 50 year warranty on the pipe and initially told ASPA that these pipes can last up to 100 years. So far, the PE pipes are not lasting more than 5 years in the ASPA water system. This project will focus on replacing PE pipes in the Tualauta Area.	This project will replace existing HDPE pipes with PVC or better material that is not affected by the oxidation degradation problem. Since there is over 150 miles of PE already installed, this project will be done in phases as funding becomes available with Tualauta as the target of this project. ASPA contacted the Manufacturer and was told that they've just come out with a better resin that ASPA can buy but no offers on repayment of the problem caused by these PE pipes. The NRW task force estimates that this ORP issue is contributing at least 20% of real losses to the high NRW in the system. (ASPA will replace 5-10 miles of PE pipe each year depending on funding and will prioritize the areas where NRW is high. This will be an ongoing long term project until all PE pipes are replaced or removed from the Water System. )	\$75.00	35	20	55	5
Aoa Water System	The existing wells produce high turbidity water to the village of Aoa (pop. 1000). Water from the wells is often contaminated with E.coli resulting in acute MCL violations as well as dirty and requiring weekly cleaning of meter and sand filter.	Connect Aoa to Masefau PWS through Sailele. The connections project will involve the installation of pipes, valves and other appurtenant works.	\$0.60	35	19	54	6
Replacement / refurbish of Tramway Tank	This 39 year-old 1MG welded steel tank exhibits an advanced state of deterioration due to corrosion. Recent ROV video inspection verifies most interior roof support rafters to be collapsed. A seismic event or strong typhoon winds could result in catastrophic failure of this tank. This tank is absolutely crucial to the operational storage requirement of ASPA's Central Distribution System.	<b>Option 1:</b> Design and construct two (2) 600,000 gallon WSTs flow control equipment and security fencing. Install 1,500 lf of 8" Φ PVC transmission line and appurtenant works. Construct 1,200 lf access road. Provide signal outputs to SCADA for storage level(s). <b>Estimated cost is \$2.7M.</b> <b>Option 2:</b> Construct a 500,000 gallon WST complete with flow control equipment and security fencing. Install 1,500 lf of 8" Φ PVC transmission line and appurtenant works. Structurally repair, sand-blast, and re-coat existing 1MG welded steel water storage tank. Provide signal outputs to SCADA for storage level(s). Estimated cost is \$2.7M.	\$2.70	34	18	52	7
Fagatogo Microfiltration System Rehabilitation	The Microfiltrationa at Vaipito is now up and running and will help provide water to the Upper Pago Pago area and Upper Fagasa Area that is currently userved by ASPA which is mandated by the USEPA. The Fagatogo Microfiltration plant is in need of rehab. Extensive works required for the upper and lower reservoirs feeding this plant.	Restore Fagatogo Microfiltration and rehabilitation of water source to include reservoirs, spring, and pipelines to connect the system.	\$2.00	31	20	51	8
Rehabilitaion of Existing Welded Steel Tanks	These tanks were built back in the 1960s and now exhibit advanced state of deterioration due to corrosion. Recent ROV video inspection verifies most interior roof support rafters are in poor condition. A seismic event or strong typhoon winds could result in catastrophic failure of some of these tanks. These tanks are crucial to the proper operation and storage requirements for ASPA's Water System.	Rehabilitate existing welded steel tanks based on inspection report conducted by an outside firm back in 2009. The inspection reports outlines what needs to be done for each of the welded steel tanks.	\$20.00	25	20	45	9

Upper Leone Water System	Since the 2009 Tsunami, people in the Leone have moved up to higher elevations and this project will provide water to these unserved higher elevation areas above the existing Leone tank.	Install surface water treatment facility to treat existing Village Water system to feed this upper area. Install new 50k WST to feed the upper area. Install all other needed appurtenances.	\$1.20	25	19	44	10
Upper Atuu Tank Replacement	The Upper Atuu tank has holes in the tank and needs to be replaced or abandoned. This was a significant deficiency in the 2013 SS.	Tank will no longer be used. ESD recommends the use of a VFD for this upper system and remove the old tank.	\$0.20	25	19	44	10
Bolted Steel Tanks Replacement/ Rehabilitation Project	Many of ASPA's existing bolted WST have deteriorated due to extreme climactic conditions. These deteriorated tanks are leaking causing an increase in water loss and a possible catastrophic disaster if left unfixed.	This project includes the replacing of these old leaking bolted steel tanks where rehabilitation is no longer feasible. Tanks that can be rehabilitated will undergo an engineers assessment and a recommendation of the type of rehabilitation required.	\$0.50	25	18	43	12
Asili Water System Improvement	Since the 2009 Tsunami, people in the Asili Village have moved up to higher elevations and this project will provide water to these unserved higher elevation areas.	Connect to new 100k gallon WST to service families that moved to higher elevation. Include construction of roadway, pipelines and other needed appurtenances for the system.	\$0.75	25	17	42	13
Manifold Malealoa Well Nos. 168, 169 and 83	This Project will maximize yield from three (3) wells, significantly reduce the costs of monitoring the wells, and provide compliance with all GWR CT requirements for the operation of these wells.	Construct one (1) 300,000 gallon WSTs with security fencing a water disinfection facility/building and an access road to each. Manifold all three wells into the WST. Construct a water disinfection facility/building to house a single CI disinfection system with a CI analyzer and SCADA output for dosage, flow, and storage level(s).	\$2.50	25	16	41	14
Manua & Satellite Systems SCADA Upgrade	This project will increase efficiency and monitoring of water system through use of SCADA.	All water tanks, wells, booster pumps, etc... will be controlled from a SCADA system that will tie each Satellite system to the main SCADA system. This will assist greatly in improving water and energy efficiency for the entire system and allow for better assessment and analysis of each system, especially due to its remoteness from the CWS.	\$0.25	23	17	40	15
Airport Loop Waterline	This project will improved the hydraulics and water quality of the regional distribution system by eliminating a dead-end on the 6" water main which currently serves the airport. By transforming the line to a looped supply, the water service to the airport will be improved in quality and pressure will be better stabilized.	Install 1,000 linear feet of 6" Ø PVC to connect the existing 6" Ø PVC adjacent to the airport to the existing 16" Ø ACP at the junction adjacent to the PX. The project includes the installation of valves and other appurtenant works.	\$0.20	27	11	38	16
Manifold Malealoa Well Nos. 91, 92 and 93	This Project will maximize yield from three (3) wells, significantly reduce the costs of monitoring the wells, and provide compliance with all GWR CT requirements for the operation of these wells.	Construct one (1) 300,000 gallon WSTs with security fencing a water disinfection facility/building and an access road to each. Manifold all three wells into the WST. Construct a water disinfection facility/building to house a single CI disinfection system with a CI analyzer and SCADA output for dosage, flow, and storage level(s).	\$1.80	25	12	37	17
Replacement of Ofu Tank	The existing tank is in a state of advanced deterioration due to the extreme climactic conditions on the island of Ofu. This project will ensure the sustainability of the Ofu satellite water system because the existing tank is the only available potable storage in the village.	Construct a 100,000 gallon bolted steel tank in the village of Ofu. The project will include the replacement of the corroded security perimeter fence.	\$0.60	25	11	36	18
Drinking Water Master Plan	The Master Plan would assist in laying out a path and/or strategy for future CIP planning.	A Master Plan will include an assessment of source water quantity and quality that incorporates elements on the proposed Sustainable GW Plan.	\$0.50	0	0	0	19
Aunu'u RO System Upgrade/Replacement	Existing RO system no longer functions properly. Post R.O. disinfection does not exist, and the treated water storage tank should be replaced with cleanable facility.	ASPA installed the building structure and is working with the RO manufacture to upgrade the RO to meet the water quality of Aunuu island. This RO unit will supply the entire water system instead of just drinking water. ASPA is also looking at drilling a new well in Aunuu to replace the current low quality water wells.	\$0.50	0	0	0	19
Water Salinity Reduction Project	Several existing Water Wells supplying the eastern side of Tutuila island are high in salinity with levels above 1000 ppm. This has caused a lot of complaints from the eastern residents. Complaints about salty water taste and damages to home plumbing is common due to this issue. This has been an ongoing issue ever since government water was supplied to the east side. Its been a long standing problem that needs a permanent solution. ASPA's efforts in drilling new wells to replace these High Salinity Wells is taking longer than anticipated and results have not been promising. ASPA is now pursuing the filtration option with RO to resolve this problem while it continues its well exploration program for a long term low cost solution.	This project will include the purchase of a containerized fully loaded RO unit to be installed at the High Salinity Wells. ASPA's in-house crew will be doing all the piping works and electrical work to connect each well to its own containerized RO unit.	\$1.00	0	0	0	19
Replacement of Onenoa Tank	The existing WST has deteriorated due to the extreme climactic conditions in the Central Water System. This project will ensure the sustainability of water distribution system in the eastern section of the island and provide water to underserved areas.	Construct a 60,000 gallon bolted steel tank in the village of Onenoa. The project will include the replacement of the corroded security perimeter fence.	\$1.50	0	0	0	19
Pago Pago to Fagasa Pass Service Area	Upper Pago Pago and both sides of the Fagasa Pass areas must still rely on untreated village water supplies. ASPA water is needed in these areas. Water from Pago Pago should be pumped up to a new WST to be constructed at the top of Fagasa pass. This project would re-classify the Fagasa distribution system as no longer a satellite, but instead part of the ASPA Central System.	Design and install needed booster pump facilities to supply upper Pago Pago and both sides of the Fagasa Pass with water. Extend Central Distribution System piping to connect with the Fagasa satellite system piping. Install all needed electro-mechanical equipment, controls, and a 0.25 MG WST at Fagasa Pass. The system will be controlled by SCADA.	\$1.30	0	0	0	19
Manu 'a Water System Sanitary Survey	This Project will insure continuation of water service for Manua community by drilling a stand by water well for Fitiuta water system as well as replacing aging and highly corroded steel bolted tanks in Fitiuta and Olosega water system.	Drill and construct a stand by well near existing Well 207 to replace Well 208 that is schedule for abandon and construct replacement tanks for Olosega water system a 0.065 MG WST and a replacement tank for Fitiuta water system a .100 MG WST as it describe in the 2010 SS Water Survey.	\$1.50	0	0	0	19
Well Abandonment	This project will improve the quality of water through the elimination of contamination to ground water sources through improperly abandoned wells.	Some of the these wells were abandoned 35-40yrs ago and ASPA is still in doubt if they were abandoned in accordance with the EPA standards. - Assess the wells and properly abandon them if not yet comply with EPA regulations. Some of the wells with high salinity/turbidity will be abandoned. Disconnect and remove all pipes from water main.	\$0.20	0	0	0	19
Install VFD Controls for Production Wells	This will improve Pump/Motor set efficiency and properly operate pumps based on preset operational parameters. VFDs will also provide balanced voltages to all 3 phase motors and protect motor sets from power deficiencies. Higher efficiencies, Automatic energy optimization, and sleep mode shuts OFF pumps when demand is low, results to energy savings. VFDs will ensure longer motor lives and provide reliable operations.	Replace full voltage starters of all major wells with Variable Frequency Drives in the in the CWS. These are pump/motor sets ranging from 20 to 50 HP.	\$0.20	0	0	0	19
Replacement of Upper Amouli Tank	The existing WST has deteriorated due to the extreme climactic conditions in the Central Water System. This project will ensure the sustainability of water distribution system in the eastern section of the island and provide water to underserved areas.	Construct a 100,000 gallon welded steel tank in the village of Amouli. The project will include installation of a perimeter fence and improvements to the existing road.	\$1.50	0	0	0	19

Small Water Pressure Boosting Systems	Several areas of Tutuila suffer from low and unreliable water pressure. This low pressure keeps the distribution system at risk to contamination from back-siphonage and infiltration.	Construct 4-5 duplex VFD pressure booster systems in Gatavai, Olotele, upper-Pago Pago Tank region, Nuu'uli-Tago's Valley, and possibly Tula near the NOAA station. The systems will be controlled by SCADA.	\$0.50	0	0	0	19
Central Water System SCADA Upgrade	This project will increase efficiency and monitoring of water system through use of SCADA.	All water tanks, wells, booster pumps, etc... will be controlled from a SCADA system that will tie the entire system together. This will assist greatly in improving water and energy efficiency for the entire system and allow for better assessment and analysis of the system.	\$0.50	0	0	0	19
Tau-Faleasao Water Line Upgrade and Replacement	This project will complement the newly constructed two well and tank systems. Replacing old valves and fittings will reduce water losses in both Tau and Faleasao. The valves are leaking due to corrosion brought about by the high concentration of chlorides in the existing well.	Purchase and install gate and control valves including fittings. The project will include breaking and restoration of existing concrete pavement.	\$0.50	0	0	0	19
Tau-Fitiuta New Water Line and Tank	Since the 2009 Tsunami, people in the Manua islands have moved up to higher elevations and this project will provide water to these unserved higher elevation areas.	Connect the two systems, 10,000LF of pipeline, 100k gallon WTS, a booster station to boost water to tank.	\$3.50	0	0	0	19
Install VFDs and Controls to 7 Booster Pump/Motor Sets.	This will improve Pump/Motor set efficiency and properly operate pumps based on preset operational parameters. VFDs will also provide balanced voltages to all 3 phase motors and protect motor sets from power deficiencies. Higher efficiencies, Automatic energy optimization, and sleep mode shuts OFF pumps when demand is low, results to energy savings. VFDs will ensure longer motor lives and provide reliable operations.	Replace full voltage starters to 7 Booster Stations with Variable Frequency Drives in the in the CWS. These are pump/motor sets ranging from 30 to 60 HP. Each booster station will have 2 VFDs and a controller. Controller will balance operating hours of each pump/motor set at a preset number of hours before change over and automatic change over from duty to standby pump/motor set, when duty set gets faulty.	\$0.20	0	0	0	19
Nuu'uli - Faga'alu Water System	The old 12" ACP from Nuu'uli to Fagalu leaks badly and it supports numerous service connections for residences and businesses as well as numerous fire-hydrant connections.	Ensure all service lines from the leaking 12" ACP line have been transferred. The 12" ACP line should be slip-lined to eliminate water losses and to retain a redundant means of transferring Tafuna well-field water to the Pago Pago area. Install a Water Storage Tank for this area.	\$2.40	0	0	0	19
Construction of Faga'alu Booster Station	The existing Faga'alu Booster Station was constructed in the early 70s and it is the main booster station for the delivery of water to the Pago Pago Harbor and to the East Bay area which includes the canneries and Leloaloe. The pump station is currently equipped with three (3) inefficient pump assemblies which are manually operated to boost and balance flows and pressures to the Bay Area. The new booster station should optimize the transmission of water coming from Nuu'uli and stabilize the flows and pressure in the Bay Area.	Design, purchase and install electro-mechanical equipment including controls and SCADA. Included in the project will be the purchase and installation of transformer banks, valves and fittings and miscellaneous mechanical pipings. Construction of a pump house including a security perimeter fence will also be required.	\$1.20	0	0	0	19
Upgrades to Well-Head Water Disinfection Facilities	This Project will protect chlorine vats from expose to intense direct sunlight reduces chlorie concentrations and improve effective disinfection.	Construct 30 disinfection facility/building to house disinfection equipments as well as upgrading chemical feed pumps (LMI Chemical Pumps) to flooded-suction chemical injection, requiring a vehicle for transportation and transporting materials and insured completion of project under 24 months	\$1.00	0	0	0	19
<b>2020/2021 Estimated Total Project Need =</b>			<b>\$180.75</b>				