FAC 8443 RESERVOIR, WATER

FY22 SUC:	$469.74 MG
Source:	Inflated from previous FY using ENR labor and material cost indices to measure actual inflation
Original Source:	Multiple Government Sources

Modeling Notes

28 October 2020

Prepared by R&K Solutions

Subject

Reevaluation of Sustainment Unit Cost for FAC 8443 Reservoir, Water

Background

For the FY21 run of Sustainment Unit Cost modeling, the FSM Configuration Support Panel (C/SP) requested that FAC 8443 be reexamined for sustainment modeling. Since the inception of the Facilities Sustainment Model, FAC 8443 had no sustainment costs associated to it, as the majority of sustainment activities near or associated with water reservoirs were resident in the definitions of other FACs (dams). As the body of knowledge of how to upkeep a lake or reservoir has grown, it is evident that there are maintenance tasks specific to the reservoir that merit a "non-zero" modeling effort.

Findings

The USACE research center for hydrology, ERDC's Coastal and Hydraulics Laboratory report that there are maintenance activities for reservoirs. The Environmental Protection Agency has Best Management Practices (BMP) for inspection and maintenance of reservoirs. The two primary documents used to aid in the selection of sustainment activities for a reservoir are:

Stormwater Best Management Practice, Design Guide Volume 3, Basin Best Management Practices by Clar and Barfield

Managing Lakes and Reservoirs, Prepared by the North American Lake Management Society.

BMP Modeling Concepts and Simulation, EPA/600/R-06/033 by Huber, Cannon and Stouder

Expected Service Life

The average age of a Reservoir in the 2019 RPAD is 35 years. This will be used as the designated "Estimated Service Life" Activities, such as major dredging, performed after this date will be considered restoration, and not be captured in sustainment modeling.

Nature of the Inventory

FAC 8443 Reservoir UM – MG

Definition: An impoundment for the storage of water that, in its natural condition, is not safe for drinking. 7 CatCodes; 2 each for Army, WHS, Navy and 1 CatCode for the Air Force.

There are 523 non-zero Asset Allocations in the 2019 RPAD. Mean size = 14.0 MG

Inputs

Analyzing service and independent sources, the following tasks are assessed as required for the typical facility over the life of a water reservoir, and meet the DoD definition of a sustainment activity:

- Maintenance Inspection, Debris Removal, and Mechanical Component Testing
- Repair Embankment and side slopes
- Removing accumulated sediment
- Repair or replacement of mechanical components; valve, piping, sluice gates, access hatches

The following activities are associated with reservoirs, but are excluded form being incorporated into SUC modeling:

- Wildlife, fish, pest, or mosquito management
- Aquatic vegetation management
- Water quality activities
- Grass mowing in the vicinity of the reservoir
- Trash, graffiti, or vandalism remediation.

Summary

With labor, material, and equipment costs for these activities, the SUC is $430.64/MG

FAC 8715 SUC FY16v18 - Storm Water Ponds													
2014 RPAD: 672 Assets													
UM: MG													
Average Size:	0.891												
ESL	20												
Maintenance Type	**Maintenance Activity**	**Frequecy**	**Duration (Hours) or total Qty (MFS)**	**Crew**	**Labor Rate (+ Fringe and Overhead)**	**Equipment**	**Equipment rate**	**Material**	**Material Quantity**	**Material Cost / Unit**	**Cost / Occurance**	**Occurances in ESL**	**Cost Over Lifetime**
Preventative Maintenance	Maintenance Inspection, Debris Removal, and Mechanical Component Testing	0.5	1.75	1 x WG9(5) 1 x WG7(5)	$ 66.64	1 x Pickup Truck	$ 13.65	0	0	0	$ 140.51	40	$ 5,620.33
Maintenance / Repair	Repair Embankment and side slopes	1	2.5	1 x WG9(5) 2 x WG7(5)	$ 96.61	1 x Truck, Dump 1 x Flatbed, 2 Axil, 25T 1 x Backhoe/loader	$ 54.75	Engineered Soil	8	$ 24.50	$ 574.40	20	$ 11,488.05
Maintenance / Repair	Mowing	0.5	9.928			Tractor w/brushog	$ 47.50	0	0	0	$ 471.58	40	$ 18,863.20
Maintenance / Repair	Removing accumulated sediment from forebays	5	4.5	1 x WG9(5) 2 x WG7(5)	$ 96.61	1 x Truck, Dump 1 x Flatbed, 2 Axil, 25T 1 x Backhoe/loader	$ 54.75	0	0	0	$ 681.12	4	$ 2,724.50
Maintenance / Repair	Remove and replace control valve	10	2.5	1 x WG9(5) 1 x WG7(5)	$ 66.64	1 x Pickup Truck	$ 13.65	Valve, Gate	1	$3,416.30	$ 3,617.03	2	$ 7,234.05
										Sum of Costs over Lifetime			$ 45,930.13
											Cost per Year		$ 2,296.51
References											Cost per UM		$ 2,577.45
Equipment Costs:	RS Means Facilities Construction Cost Data, 30th Ed												
Labor Costs	2015 Salary Tables from OPM.gov with Circular No. A-76 Revised												
Material Costs	RS Meams "Costworks" with Facility Maintenance and Repair Costbook, 2015Q3												

FAC 8443 SUC FY21 - Reservoir, Water
2019 RPAD - 523 ACT Asset Allocaitons
UM: MG
Average Size: 14.0 MG
ESL 35 Years

Maintenance Type	Maintenance Activity	Frequecy	Duration (Hours)	Crew	Labor Rate (+ Fringe and Overhead)	Equipment	Equipment rate	Material	Material Quantity	Material Cost / Unit	Cost / Occurance	Occurances in ESL	Cost Over Lifetime
Preventative Maintenance	Maintenance Inspection, Debris Removal, and Mechanical Component Testing	0.25	2.0	1 x WG9(5) 1 x WG7(5)	$ 90.56	1 x Pickup Truck, 4WD	$ 9.55	0	0	$0.00	$ 200.23	140	$ 28,032.04
Maintenance / Repair	Repair Embankment and side slopes, Erosion Repair	1	6.5	1 x WG9(5) 2 x WG7(5)	$ 131.30	1 x Truck, Dump 12T 1 x Flatbed, 2 Axil, 25T 1 x Backhoe/loader	$ 48.45	Revegetation Mat, Webbed, SY	40	$5.55	$ 1,390.37	35	$ 48,663.11
Maintenance / Repair	Repair Embankment and side slopes, Erosion Repair	1	6.5					RipRap, 18" SY	20	$109.00	$ 2,180.00	35	$ 76,300.00
Maintenance / Repair	Removing accumulated sediment	1	4.5	1 x WG9(5) 2 x WG7(5)	$ 131.30	1 x Truck, Dump 12T 1 x Flatbed, 2 Axil, 25T 1 x Backhoe/loader	$ 48.45	0	0	$0.00	$ 808.87	35	$ 28,310.62
Maintenance / Repair	Remove and replace control valve	10	2.5	1 x WG9(5) 1 x WG7(5)	$ 90.56	1 x Pickup Truck, 4WD	$ 9.55	Valve, Gate, 12"	1	$3,200.00	$ 3,450.29	3	$ 10,350.86
Maintenance / Repair	Remove and replace discharge piping, riser, spillway	20	12	1 x WG9(5) 2 x WG7(5)	$ 131.30	1 x Truck, Dump 12T 1 x Flatbed, 2 Axil, 25T 1 x Backhoe/loader	$ 48.45	Pipe, Galvanized, 12" with heavy duty grate. LF	80	$215.00	$19,357.00	1	$ 19,357.00
											Sum of Costs over Lifetime		$ 211,013.63
											Cost per Year		$ 6,028.96
											Cost per UM		$ 430.64

References
Labor Costs 2020 Salary Tables from OPM.gov with Circular No. A-76 Revised Location = Arlington VA
Material Costs RS Means "Costworks" with Facility Maintenance and Facilitie Construction, 2020Q3

Reference