

## **CHAPTER 7 – ASSET INVENTORY PROGRAM**

### **7.1 Introduction**

An integral part of the WRMP is identifying and recording GWA assets in both the water and wastewater systems. This effort entails developing a program that catalogs existing assets and also provides a system going forward for incorporating new and modified assets in a format that allows users to establish monetary values for use in record keeping for costing models. Chapter 8 – Asset Management of this volume, presents details on the ultimate use of the asset inventory. Some of the tools used in formulating the asset management program are discussed in this chapter.

### **7.2 Overview**

GWA owns thousands of assets, including pumps, motors, valves, buildings, and pipes. Each one has a current value and a replacement cost. Identifying these assets is critical to determining the long-term cost of a capital improvement program.

Historical data and other information about these assets are deficient. Records have been lost, nameplates have corroded, and institutional knowledge has left GWA over the years. To obtain the best possible information about GWA's assets, and to set the stage for future information management, a database was developed for on-site field collection of asset information. The data collection tool is called InfoCollect, and it was developed using Microsoft Access as the database software. InfoCollect was developed for use on tablet computers to facilitate field data collection.

Three teams were developed to collect asset information, each dedicated to a different area of data compilation:

1. The wastewater treatment plants and the Ugum Water Treatment Plant
2. The wastewater pumping stations
3. The wells, water booster pumping stations, and reservoirs

Underground assets, including pipes in the water distribution system and the wastewater collection system, were inventoried through the development of GWA's GIS, which is discussed in Chapter 9 – GIS Program.

InfoCollect enables the teams to develop the inventory and to populate the design data in the field. Figure 7-1, Typical Facility Screen Capture in InfoCollect shows a typical screen capture for a facility. The menu on the left provides a dropdown menu for locating facilities and their respective assets in each village and by system type. Figure 7-2, Typical Asset Information Collection in InfoCollect shows typical design data that are collected for each asset. The fields vary depending on the asset.

Though the database was intended to be used to collect condition assessment information, a separate, single team, using a separate condition assessment tool, conducted the condition assessment. This change was made to ensure consistency in evaluating the condition of equipment. The condition assessment is discussed in Volume 2, Chapter 7 – Water System Condition Assessment and Volume 3, Chapter 4 – Wastewater Condition Assessment, for the water and wastewater systems, respectively.

Figure 7-1 – Typical Facility Screen Capture in InfoCollect

The screenshot displays the 'Brown and Caldwell InfoCollect: (1.0.1783.528)' application window. The interface is divided into several sections:

- Asset Navigator (Left Panel):** A tree view showing a hierarchy of assets. The selected asset is 'WWTB Baza Gardens', which is expanded to show sub-items: 'Disinfection Process', 'Effluent Disposal', 'Electrical Generation Process', 'Location Information', 'Pretreatment Process', and 'Secondary Treatment Process'. Other WWTB assets listed include Agana, Agat, Asan, Banigada, Chalan Pago, Dededo, Inarajan, Manglao, Merizo, Mongmong, Piti, Sinajana, Taklofo, Tamuning, Tumon, Umatac, and Yona.
- Location/Other (Main Panel):** A form with the following fields:
  - Address: # Baza Gardens Waste Water Treatment Plant
  - Nearest Cross Road: CHALAN RAMON BAZA
  - Plot/Lot/Parcel: (empty)
  - Phone Number(s): 789-1197
  - Landmarks: NEXT TO TOGCHA RIVER
  - Other Location Info: OFF OF CROSSISLAND RD
  - Associated Plant: (dropdown menu)
  - GIS Coords: X (empty), Y (empty)
  - GPS Reading: lat: (empty), long: (empty)
  - Comments: Plant Capacity 0.6 MGD, Currently Recieves 0.35
  - AssetID: (empty)
  - Photo1: (empty)
  - Photo2: (empty)
  - Photo3: (empty)
- Edit Selected Item (Green Box):** A sub-form for editing the selected asset.
  - Edit Name: WWTB Baza Gardens
  - Buttons: De-Activate, Edit Name
- Bottom Panel:** Four buttons: Add Location, Add Process, Add Asset, Add Component.
- Status Bar:** Selected ID: PLNT-3-YONA-XXXX-0-XXXX-0-XXXX-XXXX-0 (SQL: 9)

Figure 7-2 –Typical Asset Information Collection in InfoCollect

**Brown and Caldwell InfoCollect: (1.0.1783.528)**

Admin Tools Tools About

Asset Navigator

- Water/Distribution Agana/Hagat
- Water/Distribution Agat
- Water/Distribution Asan
- Water/Distribution Barigada/Bar
- Water/Distribution Chalan Pago
- Water/Distribution Chaot Ordot
- Water/Distribution Dededo
- Water/Distribution Inarajan
- Water/Distribution Malojoj
- Water/Distribution Mangilao
- Water/Distribution Merizo
- Water/Distribution Other/Genera
- Water/Distribution Piti
- Water/Distribution Santa Rita
- Water/Distribution Sinajana
- Water/Distribution Takofolo
- Water/Distribution Tumon
- Water/Distribution Umatac
- Water/Distribution Yigo
- Water/Distribution Yona
- + WTP Ugum
- WWTP Agana
- WWTP Agat
- WWTP Baza Gardens
  - Disinfection Process
  - Effluent Disposal
  - Electrical Generation Process
  - Location Information
  - Pretreatment Process
  - Secondary Treatment Proces
    - Blower1
      - Blower, Default
      - Motor, Default
      - Valve, Butterfly
    - Blower2
      - Blower, Default
      - Motor, Default
      - Valve, Butterfly
      - Valve, Check XXX
    - Blower3
      - Blower, Default
      - Motor, Default
      - Valve, Butterfly
      - Valve, Check XXX
  - Clarifier
- WWTP Inarajan
- WWTP Northern
- WWTP Pago Socio
- WWTP Umatac/Merizo Plant

Location/Other **Equip. Info.** General Condition Sketch/Notes

### Motor, Default

Manufacturer	LEESON ELECTRIC	
Model Number	C326T34FB6C	
Serial Number	30056	
Motor Type		
NEMA Design	B	
Frame	326TS	
Code	G	
Service Factor	1.15	
Motor Orientation	HORIZONTAL	
Horsepower	50	HP
Voltage	230/460	V
Full Load Amps	123/112	Amps
RPM	3540	
Efficiency		
Dive Bearing	6312	
Opposite Bearing	6312	
Heater		
Breaker/Fuse Size		
Breaker/Fuse Type		
Starter Size		
Starter Type		
Overload Heater Size		
Run Time Total		hours
Capactiy Assessment		
Comments/Notes		

Add Location Add Process Add Asset Add Component

Selected ID: PLNT-3-YONA-SECN-1-BLWR-5-MOTR-MOTR-3 (SQL: 36)

**Vol 1 Chapter 7**  
**Asset Inventory Program**

---

As assets are added to the database, a unique asset identification number is developed. The description below shows two examples of how the asset ID is developed. A table of descriptors follows each of the acronyms/numbers of the asset ID that are highlighted in red. All other asset IDs can be interpreted in the same manner. Figures 7-3 through 7-8 illustrate asset identification development.

Figure 7-3 – System Designator Portion of Asset ID

Asset ID: **COLL-9**-MANG-INFP-5-BLDG-1-BLDG-BLDG-1

- Description – Associated with the wastewater collection system

Asset ID: **DIST-19**-MALO-BPMP-2-PUMP-25-VALV-VGAT-5

- Description – Associated with the water distribution system

Edit Facility Acronyms	
Acronym	Description
ADMI	Administration
PLNT	Plant
RESV	Reservoir
SITE	Site w/Multiple Facilities
SPRG	Spring
WWES	Waste Water Ejector Station
WWIS	Waste Water Injector Station
WWPS	Waste Water Pump Station
COLL	Waste Water/Collection Site
WBPS	Water Booster Pump Stations
DIST	Water/Distribution
WELL	Well
*	

Figure 7-4 – Village Designator Portion of Asset ID

Asset ID: COLL-9-MANG-INFP-5-BLDG-1-BLDG-BLDG-1

- Description – Located in Mangilao

Asset ID: DIST-19-MALO-BPMP-2-PUMP-25-VALV-VGAT-5

- Description – Located in Malojloj

Edit Area Acronyms	
Acronym	Description
▶ AGHT	Agana Heights
HAGA	Agana/Hagatna
AGAT	Agat
AIRB	Air Force Base
ASAN	Asan
BARR	Barrigada/Barrigata Heights
CHAL	Chalan Pago-Ordot
CHOR	Chaot-Ordot
DEDE	Dededo
INAR	Inarajan
MALO	Malojloj
MANG	Mangilao
MERZ	Merizo
MONG	Mongmong-Toto-Maite
NAVY	Navy Base
OTHR	Other/General
PITI	Piti
RITA	Santa Rita
SINA	Sinijana
TALO	Talofofu
TAMN	Tamuning
TUMN	Tumon
UMAT	Umatac
WIGO	Wigo
WONA	Wona
YIGO	Yigo
YONA	Yona
*	

Figure 7-5 – Facility Designation Portion of Asset ID

Asset ID: COLL-9-MANG-INFP-5-BLDG-1-BLDG-BLDG-1

- Description – Associated with pumping of raw sewage (e.g., pump station)

Asset ID: DIST-19-MALO-BPMP-2-PUMP-25-VALV-VGAT-5

- Description – Associated with water pumping (e.g., booster pump station)

Edit Process Acronyms	
Acronym	Description
▶ BPMP	Booster Pumping
CHEM	Chemical
CLWL	Clear Well
COLL	Collection System
DEWT	Dewatering
DIGS	Digestion
DISF	Disinfection
DIST	Distribution System
EFFD	Effluent Disposal
EFFP	Effluent Pumping
ELEC	Electrical
EGEN	Electrical Generation
FILT	Filtration
FPMP	Finished Water Pumping
FLOC	Flocculation
HDWK	Headworks
INFP	Influent Pumping
INST	Instrumentation
INTK	Intake
SITE	Location Information
NONE	None
ODOR	Odor Control
PRET	Pretreatment
PRIT	Primary Treatment
RESV	Reservoir
SCAD	SCADA/Telemetry
SECN	Secondary Treatment
SEDI	Sedimentation
SLID	Solids Handling
SPRG	Spring
STRG	Storage
THIK	Thickening
WELL	Wells

Figure 7-6 – Asset Type Designation of Asset ID

Asset ID: COLL-9-MANG-INFP-5-BLDG-1-BLDG-BLDG-1

- Description: Associated with a building on the site

Asset ID: DIST-19-MALO-BPMP-2-PUMP-25-VALV-VGAT-5

- Description – Associated with a booster pump

Edit Asset Acronyms	
Acronym	Description
AEDG	Aerobic Digestion
ANDG	Anaerobic Digestion
BLWR	Blower
BOIL	Boiler
BLDG	Building
CENT	Centrifuge
CHLR	Chlorinator
CLAR	Clarifier
COLL	Collection System
DIFF	Diffuser
DIST	Distribution System
DBED	Drying Beds
EJTK	Ejector
EDST	Electrical Distribution
GREM	Grit Removal
INJT	Injector
INST	Instrumentation
INTK	Intake System/Structure
LABY	Laboratory
MANH	Manhole
MISC	Miscellaneous Equipment
OUTF	Outfall
PBSN	Percolation Basins
PIPE	Pipe
POND	Pond
PUMP	Pump
RESV	Reservoir
SCAD	SCADA
SCRN	Screening
SEPT	Septic System
SITE	Site/Area General
TANK	Tank
WELL	Well

Figure 7-7 – Asset Component Designator for Asset ID

Asset ID: COLL-9-MANG-INFP-5-BLDG-1-BLDG-BLDG-1

- Description – Associated with a building on the site

Asset ID: DIST-19-MALO-BPMP-2-PUMP-25-VALV-VGAT-5

- Description – Associated with a valve on the pump

Edit Class Acronyms	
Acronym	Description
AERT	Aerator
ALTV	Altitude Valve
AQUA	Aquifer
BLWR	Blower
BLDG	Building
CENT	Centrifuge
COLL	Collector
COMP	Compressor
CONV	Conveyor
DIFF	Diffusor
EPNL	Electrical Panel
ELEC	Electrical System
GEAR	Gear
EDST	Generator
GRND	Grinder
HVAC	HVAC
HYDT	Hydrant
INCT	Instrumentation and Controls
MANH	Manhole
MFLD	Manifold
METR	Meter
MIXR	Mixer
MOTR	Motor
EMCC	Motor Control Center
OUTF	Outfall
PIPE	Pipe
POND	Pond
HPOT	POT Holding Tank
PLCC	Programmable Logic Controller
PUMP	Pump
RWAL	Retaining Wall
SCAD	SCADA
SITE	Site Improvements
STRC	Structure
TANK	Tank
TROG	Trough
VALV	Valve
VOPR	Valve Operator
VFDR	Variable Frequency Drive
VEHI	Vehicle
WELL	Well



Figure 7-8 – Asset Component Number Designation for Asset ID

Asset ID: COLL-9-MANG-INFP-5-BLDG-1-BLDG-BLDG-1

- Description – Provides detail on the building structure

Asset ID: DIST-19-MALO-BPMP-2-PUMP-25-VALV-VGAT-5

- Description – Defines the valve as a gate valve and provides detail

Edit Type Acronyms		
Class	Acronym	Description
▶ AERT	AERT	Aerator, Default
ALTV	ALTV	Altitude Valve, Default
AQUA	AQUA	Aquifer, Default
BLDG	BLDG	Building, Default
BLWR	BLWR	Blower, Default
CENT	CENT	Centrifuge, Default
COLL	COLL	Collector, Default
COMP	COMP	Compressor, Default
CONV	CONV	Conveyor, Default
DIFF	DIFF	Diffusor, Default
EDST	EGEN	Electrical, Generator
ELEC	ETNS	Electrical, Transformer
ELEC	ATSW	Electrical, Auto. Transfer Switch
ELEC	ELEC	Electrical System, Default
EMCC	EMCC	Motor Control Center, Default
EPNL	EPNL	Electrical Panel, Default
GEAR	GEAR	Gear, Default
GRND	GRND	Grinder, Default
HPOT	HPOT	POT Holding Tank
HVAC	HVAC	HVAC, Default
HYDT	HDRB	Hydrant, Dry Barrel
HYDT	HWTB	Hydrant, Wet Barrel
HYDT	HYDT	Hydrant, Default
INCT	INCT	Instrumentation and Control, Default
MANH	MANH	Manhole
METR	METR	Meter, Default
MFLD	MFLD	Manifold, Default
MIXR	MIXR	Mixer, Default
MOTR	MOTR	Motor, Default
OUTF	OUTF	Outfall, Default
PIPE	PYRD	Pipe, Yard
PIPE	PIPE	Pipe, Default
PLCC	PLCC	Programmable Logic Controller, Default
POND	PSUP	Pond, Supply
POND	POND	Pond, Default
POND	PRET	Pond, Retention
POND	PLAG	Pond, Lagoon
PUMP	PRLB	Pump, Rotary Lobe
PUMP	PRWA	Pump, Raw Water
PUMP	PSRW	Pump, Screw
PUMP	INJT	Pump, Chlorine

### 7.3 Equipment and Maintenance Submittal Requirements

The purpose of this procedure is to develop a means by which information for new equipment pertinent to GWA's asset inventory can be acquired. It eliminates the time-consuming task by GWA staff of extracting information from volumes of O&M manuals and from equipment nameplates. The procedure should be incorporated into GWA's procurement process for its most effective use. The procedure can be adapted easily as a specification for new equipment.

- Step 1.** Provide specific maintenance information inserted in pre-labeled file folders, as described in Step 5 below, for each unit of mechanical, HVAC, electrical, and instrumentation equipment or system and each instrument. Maintenance information provided under this section is in addition to any similar data that are included in standard vendor or manufacturer's O&M manuals.
- Step 2.** Provide a tab for each section as described in Step 5. Insert in each file folder the specific information described in Step 5.
- Step 3.** The following instructions apply to forms XXX-A, XXX-B, and XXX-C.
- Submit forms on colored paper as follows:
    - XXX-A – Canary
    - XXX-B – Green
    - XXX-C – Blue
  - Type the information onto the appropriate color-coded form.
  - Type N/A (not applicable) into any information box for which the requested information is not applicable to the subject equipment.
  - Identify the units of measurement for numerical values.
  - Leave the following boxes blank:
    - Date Installed
    - Date of Warranty
    - Purchase Order #
    - Purchase Cost
  - No substitutions for completion of these forms are permitted.
- Step 4.** When more than one identical piece of equipment or instrument is supplied, follow the steps below:
- Provide completed color-coded form XXX-A and XXX-B, as appropriate, in Tab 1 of a separate file folder for each individual piece of equipment.
  - Provide completed color-coded form XXX-D in Tab 2 of the file folder for the individual piece of equipment described above.
- Step 5.** Insert the specific information described below in the file folders:
- Tab 1 – Equipment Data

- Insert completed color-coded form XXX-A, Mechanical Equipment Data Record Form; or XXX-B, Electrical Equipment Data Record Form, as appropriate.
- Tab 2 – Maintenance Information
  - Insert completed color-coded form XXX-C, Equipment Maintenance Requirement Record Form. Include on the form the description and schedule for all manufacturers' recommended routine maintenance procedures, including specific lubrication recommendations. Indicate with an "X" in the appropriate box whether the procedure is to be done daily, weekly, monthly, quarterly, semiannually, or annually; or fill in the hours of operation when the maintenance is required. (See sample record forms in Figures 7-9 through 7-11.)

## **7.4 Verification Process**

### **7.4.1 Verification and Completion by Operations and Maintenance Staff**

- O&M staff will verify that the information has been submitted as required, will fill in the "Date Installed" blank, and will then submit to the Finance department. Payment to the vendor/supplier should be contingent upon proper completion of the vendor/supplier forms. If the forms are not properly completed, O&M staff should return them to the vendor/supplier.
- If the equipment is for GWA storeroom inventory, O&M staff will not fill in the "Date Installed" blank. When the equipment is actually installed, the O&M staff will fill in the "Date Installed" blank and submit the form to the data entry person for transfer of the information from storeroom inventory to its proper location in the database.

### **7.4.2 Verification and Completion by Finance Staff**

- Finance staff will verify that the forms are completed properly and will fill in the "Date of Warranty," "Purchase Order #," and "Purchase Cost" information. Payment to the vendor/supplier should be contingent upon proper completion of the forms.

### **7.4.3 Entry into Asset Inventory Database**

- Finance staff will submit the completed forms to the person responsible for data entry. This person will enter the information into the asset inventory database and then return the forms to O&M staff for filing.
- If the equipment is for stores inventory, it will be entered in the database as an inventory item, and then transferred to the database once it is installed.

## **7.5 Conclusions**

An asset inventory database is a valuable tool for

- Identifying and recording GWA assets in both water and wastewater systems.

- Preventing the loss of data when records are misplaced, equipment nameplates corrode, or personnel leave the organization.
- Allowing users to establish monetary values for costing models, especially current values and replacement costs. Chapter 8 – Asset Management of this volume presents further details on asset inventory use.

#### **7.6 Recommendations**

Incorporate a procedure into the procurement process for providing new equipment information. Information provided by the manufacturer in a prescribed format will save GWA staff effort in incorporating the new asset into the inventory database.

#### **7.7 CIP Impacts**

An asset inventory database is a critical information tool for determining long-term capital improvement program costs.

Figure 7-9  
GWA Form XXX-A: Mechanical Equipment Data Record Form  
General Data

Equipment Number		Equipment Location	
Equipment Description		Serial Number	
Model Number		Style Number	
Manufacturer			
Street Address			
City		State/Postal Code	
Phone		Fax	
Manufacturer Contact		Phone	
Vendor			
Street Address			
City		State/Postal Code	
Phone		Fax	
Vendor Contact		Phone	
Date Installed		Date of Warranty	
Purchase Order #		Purchase Cost	

Technical Data

Size		Weight	
RPM		Design BHP	Impeller Diameter
Rotation Discharge		Bearing Lubrication	
Bearing Numbers and Quantity			
Applicable Tolerances			
Oil/Air Filters			
Seal Data			
Style		Make	
Size		Cooling	
Lubrication		Lip Seals	
Seal Type/Numbers			
Additional Valve Data			
Style		Make	
Drive Data: Coupling			
Style		Make	
Type			
Drive Data: V-Belt			
Make		Belts	
Driver		Driven	

Figure 7-10  
 GWA Form XXX-B: Electrical Equipment Data Record Form  
 General Data

Equipment Number		Equipment Location	
Equipment Description		Serial Number	
Model Number		Style Number	
Manufacturer			
Street Address			
City		State/Postal Code	
Phone		Fax	
Manufacturer Contact		Phone	
Vendor			
Street Address			
City		State/Postal Code	
Phone		Fax	
Vendor Contact		Phone	
Date Installed		Date of Warranty	
General			
Nominal Voltage	Phase	Freq.	kW
Power Factor	Amps	Ambient Temp	Temp Rise
Nominal Efficiency	Insulation Class	Insulation Type	BIL
Weight	Enclosure Type	Enclosure Size (H x W x D)	
Approved Hazard Classification:	Class	Division	Group
Additional Motor Data			
Synch. RPM	HP	Frame	LRA
Design Letter	KVA Code	Duty	Guaranteed Minimum Efficiency @ Full Load
Winding Heater Volts		Winding Heater Watts	
Over Temp. Sensor Type	DE Bearing	ODE Bearing	
Additional Transformer Data			
Secondary Volts	Winding Connection:		HV
% Impedence (Z)	Type		LV
Additional Breaker Data			
Interrupting Rating	Momentary Rating		Frame Size
Thermal Trip Range		Instantaneous Trip Range	
Additional Starter Data			
Overload Setting Range			
Contactor Rating:	Size	HP	Amps

