

# SOLID WASTE MANAGEMENT SYSTEMS ASSET TAGGING STANDARD

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# 1. ASSET IDENTIFICATION STANDARD

## 1.1 Purpose of the Standard

- A. The purpose of this document is to establish a Standard that will enable efficient management of Asset related database records, information, physical equipment field Tags and Asset Identification.
- B. This document describes the naming convention for all Solid Waste Management Systems (SWMS) Assets and Components, with the exception of wiring, office equipment, vehicles, and IT equipment where it is not part of a Process and Subprocess (for example, the standard applied to Scalehouse computers and printers as they are part of the weighing function).
- C. The Standard will provide a unique Tag (Identification) for each Asset (that is each piece of equipment or device) in order to allow flexibility in data management. Asset and Components terms defined in this standard must be used if possible. Any new terms created must be approved by the Asset Management Unit and be specific to one type of device only.
- D. This document is a Standard specification to be included in all design contracts and information systems, control systems or contracts related to the installation or removal of equipment.
- E. For all new and existing installation of Asset, all Contract Drawings shall include the appropriate Asset Tag or be assigned a new unique Tag as per this Standard. Any existing Asset Tags shall be provided, according to the most current version of this Standard.
- F. The use of abbreviations in text is allowed with the following restrictions:
  - Only one abbreviation may be used for a word or phrase.
  - A glossary of abbreviations shall be provided to the Asset Management Unit.

## 1.2 Definitions

- A. "Asset" describes a single piece of equipment or a group of related equipment or devices at a specific location within a Site which perform a certain function.
- B. "Asset Component or Component" is a physical entity for which there is a desire to:
  - Retain Asset specifications or data.
  - Retain costing information against
  - Associate the Entity Operating Procedures or Process Narratives
  - Schedule Planned Maintenance and record maintenance activities.
- C. "Asset Tag" is a unique identifier for a specific Asset or Asset Component or required data point. The Asset Tag is used to identify equipment in the field, in the Work Management System and on all facility design documents and Operations and Maintenance manuals.
- D. "Virtual Asset Tag" is a point other than physical equipment or devices within the field that receive a Tag name to be used within the Work Management System (WMS). The standard will associate the virtual Tags with the physical equipment where applicable.

## 2. ASSET TAG STANDARDS

### 2.1 Asset Tag Assignment

- A. Asset Tags are developed and designed to be included in the “Asset Inventory Information Requirements” (Sample Provided in Appendix A) using this Standard. All proposed Asset Tags must be unique and compliant with this Standard.
- B. The Asset Management Unit (AMU) must approve all new Asset Tags to confirm compliance with the Standard. Rules which the Asset Tags must comply with:
  - The new Asset Tag is to be shown on all documentation produced during Design.
  - A physical Asset Tag is to be affixed at the equipment location, where the Standard applies.
- C. New Asset Tag Names are to be entered the Asset Inventory which must include:
  - the Asset Tag Name as assigned according to this Standard.
  - the Asset Information Spreadsheet will also contain location attributes (Site, Process, location) and Asset attributes (Parent Asset)
- D. Once an Identification has been assigned, the Work Management System will be updated to indicate if a piece of equipment has been added, removed, or moved. The asset information in the Work Management System will also be edited to reflect a new piece of equipment in that location.
- E. All Tags covered under this Standard are to be included on all design and “As-Built” drawings.

### 2.2 Asset Tag Coding System

- A. The Asset Tag Coding System consists of up to twenty (20) characters and each section may be of an alpha-numeric combination.
  - Dashes are included, as shown in the examples below.
  - The basic Tag Code shall be:

<b>AA-AAA-</b>	<b>AAA-</b>	<b>AAAA-</b>	<b>NNN</b>	<b>A</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>

*Where:*    A    Denotes Alphabetic character (letter)  
              N    Denotes Numeric character (number)

- B. Each fragment has specific functions and meaning. These fragments or groups of characters are denoted by the numbers 1 to 5 and have the following functions:

- Fragment 1 is a six-digit character representing the Operational Unit and Site/Installation. (See section 2.3)
- Fragment 2 is a three-character code representing a Process and Subprocess within the Site/Installation. (See Section 2.4)
- Fragment 3 is a one to four-character code representing the type of Asset or Component (section 2.5)
- Fragment 4 is a three-digit numeric code that identifies the Asset Identification (ID) for each Asset or Asset Component. Each Asset or Component will be assigned a Tag in the Work Management System (See Section 2.6)
- Fragment 5 is a one-character alphabetic code used where there are two Assets which would otherwise have identical Asset Tag ID under the Tagging Standard (See Section 2.7)

**Table 1: Example of Asset and Component and Tags**

<b>Asset or Component</b>	<b>Asset Tags</b>
Compactor	TS-DUF-PEQ-CMP-
Hopper and Chute	TS-DUF-PEQ-HOP-
Hydraulic Piston	TS-DUF-PEQ-PST-1NN
Ram	TS-DUF-PEQ-RAM-
Control Panel	TS-DUF-PEQ-CP-1NN
Emergency Stop	TS-DUF-PEQ-EST-1NN
Hydraulic Power Pack	TS-DUF-PEQ-HPU-
Pump	TS-DUF-PEQ-P-1NN
Motor	TS-DUF-PEQ-M-1NN
Pressure Relief Valve	TS-DUF-PEQ-V-1NN
Radiator	TS-DUF-PEQ-R-1NN

## **2.3 Operational Units and Site/Installation Codes (Fragment 1)**

- A. The Operational Units and Site/Installation codes use the first two characters to denote type of Operational Unit:
- TS - Waste and Recycling Transfer Station
  - YD – Collection or Maintenance Yard
  - OL - Operating Landfill
  - CL – Closed Landfills
  - OP – Organics Processing Facility

B. A list of Site/Installation Codes is represented in the following table:

**Table 2: A list of Site/Installation Codes**

CODE	SITE
TS-BER	Bermondsey Transfer Station
TS-COM	Commissioners Transfer Station
TS-DIS	Disco Transfer Station
TS-DUF	Dufferin Transfer Station
TS-ING	Ingram Transfer Station
TS-SCA	Scarborough Transfer Station
TS-VIC	Victoria Park Transfer Station
YD-BER	Bermondsey Yard
YD-DUF	Dufferin Maintenance Yard
YD-ING	Ingram Yard
OL-GLL	Green Lane Landfill
CL-AME	Amesbury
CL-BRL	Beare Road
CL-BLU	Blue Haven
CL-BWL	Brock West
CL-COE	Coe Hill Area A and B
CL-DIS	Disco
CL-DON	Donlands
CL-RVD	Riverdale
CL-LRW	Riverwood Lower
CL-URW	Riverwood Upper
CL-STO	Storer Drive
CL-SUN	Sunrise
CL-SWD	Stan Wadlow Area A
CL-THK	Thackeray
CL-KVL	Keele Valley
CL-MSL	Morningside
CL-ORT	Orton Park
CL-WAS	Warden School

- C. For all Asset within the physical boundary (i.e., property line) of the Site/Installation assign the Code corresponding to Site/Installation, this includes equipment within all buildings and Work Areas.
- D. Assign Asset and Components to the Site/Installation where they are located outside of a property boundary but are part of an on-Site Process (for example, Stormwater Management equipment which lies outside the property boundary, but is part of the Stormwater Management System for the Site, where it is owned and/or maintained by SWMS).

- E. Codes for Closed Landfill Sites represent Sites at which Electrical Assets Tagging (Arc Flash Project) has taken place. Additional Sites may be added to the list of Closed Landfills at which Asset Tagging should take place.

## 2.4 Process and Subprocess Codes (Fragment 2)

- A. Process and Subprocess Codes generally correspond to areas within a Site which support a specific function or "Work Area". Assets will be assigned the Process and Subprocess code for where it is located, except for:
- Assets that are normally considered part of a Process and Subprocess but are located in a different Work Areas should be assigned to the normal Process and Subprocess e.g., shop equipment stored away from primary location will be Tagged as part of its primary location.
  - Assets of a distribution process, such as electrical distribution, are usually assigned to the Process area in which they are situated. For example, electrical distribution within a building will be assigned the Process and Subprocess code for the building it is within. Electrical equipment that provides electrical distribution to more than one Process should be coded as Site Electrical (SEL).
- B. Process and Subprocess Codes are listed below. It may be necessary to add codes to this list in order to correctly Tag all equipment. Process and Subprocess Codes shall only be added with the written approval of City Staff.

**Table 3: Process and Subprocess Codes**

CODE	PROCESS AND SUBPROCESS
ADM	Admin Office
GSE	Ground Security Elements (Fences, Gates, Locks)
LND	Landscaping
MSP	Machine Shop
MTC	Maintenance and Vehicle Garages
RWS	Retaining Wall or Structure (Bunkers)
SDM	Salt Dome
SEL	Site Electrical
SGN	Signage
SSV	Piping (Site Services)
STD	Storage Dome
SWM	Stormwater Management
TRS	Roadways and Fueling

### Transfer Stations

CODE	PROCESS AND SUBPROCESS
BDD	Bi-Level Drop-off Depot
HHW	HHW Building
HWS	HHW Storage
PEQ	Processing Equipment
RHG	Recycling Haulage
RTR	Recycling Transfer
SCH	Scalehouse
TRB	Transfer Building
WHG	Waste Haulage
WSC	Weighscale
WTR	Waste Transfer
YWT	Yard Waste Transfer

### Closed Landfill Operations

CODE	PROCESS AND SUBPROCESS
CDS	Condensate System (Landfill)
CLM	Clay Liner Monitoring
GWM	Groundwater Monitoring and Treatment
LCS	Leachate Collection
LFG	Landfill Gas Collection and Monitoring
LGD	Gas Detection
PWL	Purge Wells

### Organics Processing Facilities

CODE	PROCESS AND SUBPROCESS
REC	SSO Receiving
PUL	SSO Pulping
RSM	Residual Management System
GRS	Grit Removal System
DIG	Digestion
DEW	Digestate Dewatering
BGS	Biogas
WW	Wastewater Treatment
NPW	Processing Water Distribution
OAC	Odour Control System
BMS	Building Management System

## 2.5 Asset Codes (Fragment 3)

- A. Assign Asset Codes according to the category that best describes the Asset or Component.
- B. Virtual Asset Tags should be created for all Assets and Components which currently exist within the Work Management System and are active, Assets and Components for which information is tracked or will be tracked and for all Assets and Components associated with a Standard Operating Procedure (for example, Sampling Ports or

Power Sources)

C. Virtual Asset Tags shall not be assigned for the following:

- Vehicles (including loaders and trailers)
- Communication equipment (telephones, communication wiring), unless it is part of the fire suppression system or the site security system.
- Office equipment (furniture, lunchroom appliances)
- IT Equipment (computers and printers) unless they are an integral part of process.
- Hand Tools (drills, saws, wrenches, and other minor shop equipment)

D. Multiple assets can be grouped together as a single asset if they are located in the same **building** for the following:

- Foundation
  - Floor, Tip Floor
- Building Exterior
  - Walls, Roof
- Plumbing
  - Floor Drains
- Building Interior
  - Personnel Doors, Elevator, Windows, Stairs
- Roadways and Fueling
  - Roadways, Parking, Signs
- Site Landscaping
  - Interior Fencing, Landscaping
- Site Electrical
  - Exterior Lighting
- Piping
  - Watermains, Sanitary Sewers, Storm Sewers
- Site Security
  - Gates, Perimeter Fence
- Retaining Walls/Structures
  - Bunkers



- E. Multiple assets can be grouped together as a single asset if they are located in the same **room/area** of a building for the following:
- Electrical
    - Lighting Fixtures, Lighting Panels
  - Plumbing
    - Toilets, Sinks, Showers
- F. Where two codes might apply, use the code that gives the more precise meaning.
- G. A list of Asset Codes is provided below. Codes may have to be added to fully capture all Assets and Components. All new Codes must be approved by City of Toronto Staff.

**Table 4: List of Asset Codes**

CODE	EQUIPMENT DESCRIPTION
ACU	Air Conditioning Unit
AED	Defibrillator
AIT	Analyzer
AHU	Air Handling Unit
BDP	Bi-Level Depot Platform
BF	Biofilter Cell
BFD	Building Foundations
BFL	Building Floor
BFP	Backflow Preventer
BIE	Building Interior Elements (Railings, stairs)
BL	Blower
BO	Boiler
BPF	Prefabricated Building
BRF	Building Roof (Structure) - WMS Only
BST	Building Structural Elements (Beams, Columns)
BU	Burner
BWD	Building Windows - WMS Only
BWL	Building Walls (Structure) - WMS Only
C	Compressor
CAB	Storage Cabinet / Cage
CBN	Catchbasin
CDT	Condensate Separation Tank
CHL	Chlorinator
CI	Chiller
CF	Centrifuge
CL	Classifier
CMP	Compactor
CP	Control Panel
CPL	Coupling Device (Bellows)

CODE	EQUIPMENT DESCRIPTION
CPU	Computer
CR	Card Reader
CV	Conveyor
D	Air Dryer / Dehumidifier
DG	Diesel Generator
DM	Motorized Damper or Louvre
DOC	Dust and Odour Control
DR	Door (Security doors, access doors and interior
DRN	Drains (for WMS only)
ECS	Electric Vehicle Charging Station
EF	Exhaust Fan
ELV	Elevator
EP	Electrical Panel
ES	Electric Strike
EST	Emergency Stop
EWS	Eye Wash Station
F	Filter
FAK	First Aid Kit
FEX	Fire Extinguisher
FEQ	Fire Protection Equipment (Hoses, Cabinets)
FH	Fire Hydrant
FIT	Flow Indicating Transmitter
FL	Landfill Gas Flare
FM	Forcemain
FN	Fan (Supply)
FNC	Fence
FPN	Fire Panel
FU	Furnace
FX	Flame Arrestor
G	Gate
GCW	Gas Collection Well
GEN	Generator
GS	Natural Gas Distribution
HD	Header
HE	Heat Exchanger
HLN	Haulage Lanes
HOP	Compactor Hopper and Chute (WMS Only)
HPR	Hopper
HPU	Hydraulic Powerpack Unit
HTR	Heater
HU	Humidifier
IWP	Inbound Weighscale Pit (WMS Only)
IWS	Inbound Weighscale
IRR	Irrigation
LC	Weighscale Load Cells
LCP	Local Control Panel
LD	Lifting Device

CODE	EQUIPMENT DESCRIPTION
LIT	Level Indicating Transmitter
LOA	Loading Dock
M	Motor
MCC	Motor Control Centre
MH	Manhole
MON	Monitor
MX	Static Mixer
NWL	Noise Attenuation Wall
OHD	Overhead Doors
OS	Compactor Oil Separator
OWP	Outbound Weighscale Pit (WMS Only)
OWS	Outbound Weighscale
P	Pump
PD	Digester
PF	Fire Pump
PFX	Plumbing Fixtures (sinks, bathroom fixtures)
PGA	Portable Gas Analyzer
PIP	Piping Section or System (WMS only)
PIT	Pressure Indicating Transmitter
PLC	Programmable Logic Controller
PN	Panel
PPR	Pulper
PRNT	Printer
PRS	Press
PST	Compactor Hydraulic Piston (WMS Only)
PW	Purge Well
R	Radiator
RAM	Compactor Ram (WMS Only)
ROC	Roll-Off Container
RWD	Roadway
RWL	Retaining Wall
SAE	Site Access Elements (stairs, hatches)
SAN	Sanitary Sewer (WMS Only)
SCAM	Security Camera
SCN	Service Connection
SM	Shop Machine
SPK	Sprinkler System
SPS	Spotter Shack
SS	Security System
SSE	Site Safety Elements (Bollards, Guardrails, Railings)
SSN	Sampling Station
STC	Stormceptor
STK	Stack
STM	Storm Sewer (WMS Only)
STP	Stormwater Pond
STR	Site Transportations (parking, sidewalks)
SWB	Switchgear Breaker

CODE	EQUIPMENT DESCRIPTION
T	Hot Water Tanks
TF	Transfer Station Tip Floor
TIT	Temperature Indicating Transmitter
TR	Transformer
TRL	Traffic Lights
TS	Fuel Storage Tank
UPS	Uninterruptible Power Supply
V	Valve, Actuators
VFD	Variable Frequency Drive
VNT	Vent
W	Water Well
WF	Water Fountain
WM	Watermain (WMS Only)
WP	Wash Pad
WPS	Pressure Wash System
YWP	Yard Waste Storage Pad (WMS Only)

**Table 5: Additional Codes for Electrical Equipment and Drawings**

CODE	EQUIPMENT DESCRIPTION
ADL	Autodialer
AS	Alarm System (Light, Horn, Disarm Device)
ATS	Automatic Transfer Switch
BAT	Battery
BKR	Breaker
CAP	Capacitor
CB	Circuit Breaker
CDT	Electrical Conduit
CCT	Circuit
CPL	Coupling Device
CPT	Control Power Transformer
CR	Control Relay
CT	Current Transformer
DM	Digital Meter
DS	Disconnect Switch
FAS	Fire Alarm System
FS	Fuse
FPR	Feeder Protection Relay
FVNR	Full Voltage Non-Reversing
FVR	Full Voltage Reversing
GPR	Generator Protection Relay
HOA	Hand-Off-Auto
INV	PV Inverter
JB	Junction Box
LA	Lightning Arrestor
LB	Load Break

CODE	EQUIPMENT DESCRIPTION
LEM	Emergency Lighting
LGE	Exterior Lighting
LGI	Interior Lighting
LGS	Site Lighting
LP	Lighting Panel
LR	Local-Remote
MMS	Manual Motor Starters
MOA	Manual-Off-Automatic
MPR	Motor Protection Relay
MTR	Meter
MTS	Manual Transfer Switch
OL	Overload
PDP	Power Distribution Panel
PNLB	Panelboard
PS	Power Supply
PV	Solar Panel
RPU	Remote Processing Unit
RTU	Remote Terminal Unit
SEN	Sensor
SW	Switch
TDR	Time Delay Relay
TS	Transfer Switch
VT	Voltage Transformer

## 2.6 Asset Number (Fragment 4)

- A. Generally, the Asset number is a three-digit number (001 to 999).
- B. The numbering for Assets should start at '001' and increase sequentially for all related Assets and Components. For example:
  - The main Asset Grouping of the Subprocess, the Compactor, is numbered "TS-DUF-PEQ-CMP-101" for Compactor 1 and, "TS-DUF-PEQ-CMP-102", for Compactor 2
  - The associated Component, the Hydraulic Powerpack is numbered "TS- DUF-PEQ-HPU-101" for Compactor 1 and TS-DUF-PEQ-HPU-102" for Compactor 2
- C. When new assets are added, numbering should continue from the last number on file. For example, if the last compactor was TS-DUF-PEQ-CMP-102 then the next one will be TS-DUF-PEQ-CMP-103. Avoid restarting the number from 001 or 101 in this case as there maybe operational or financial data associated with the previous asset tag.
- D. Wherever possible, a new first digit must be utilized for each Process and Subprocess at each Site. For example, all the "Compactors" Subprocess can be assigned a numbering system "1NN", while all Building Fire Equipment Subprocess may be assigned the numbering system "2NN".
- E. Related Processes, for example HHW Buildings and HHW Storage or Scalehouse and Weighscales, many share an Asset Number first digit.

- F. Coding systems must be included in Tagging plans and approved for each Site.

## **2.7 Duplicate Item Suffix (Fragment 5)**

- A. This fragment starts with A for the first repeated item. Subsequent items continue in alphabetical order.
- B. This fragment is reserved for unique situations where duplicate Assets or Components are present. Suffixes should be assigned as consistently as possible.
- C. Example: Two heaters at Donlands Closed Landfill that are part of the same circuit and located in close proximity:
  - CL-DON-LFG-HRT-103A and CL-DON-LFG-HRT-103B

### 3. PHYSICAL TAGS

#### 3.1 Setting Asset Criticality and Consequence of Failure

- A. All Assets and Components must be assigned a Criticality Score based on the Consequence of Failure (CoF) as defined in the table below.

Table 6: Consequences of Failure (CoF) of Asset Criticality

Criticality Score	Consequence of Failure (CoF)
<b>Negligible - 1</b>	<p>Little to no impact on Health and Safety, injuries are unlikely.</p> <p>Little to no impact on Environmental receptors, unlikely to result in need for mitigation.</p> <p>Little to no impact to operations</p> <p>Can be accommodated within planned replacement schedule or repaired within a few days.</p>
<b>Minor - 2</b>	<p>Minor impacts to Health and Safety, could result in minor injuries (requires first aid)</p> <p>May Result in short term (less than six months) impact to Natural Receptors but can be fully mitigated.</p> <p>Some increase in operational complexity but can be accommodated within existing operations.</p> <p>Can result in a minor, unplanned expenditure (includes asset replacement, environmental cleanup, loss of revenues and increased cost of operations and maintenance).</p>
<b>Medium - 3</b>	<p>Moderate impact to Health and Safety, may result in injuries which are not critical, but require medical attention.</p> <p>Moderate impact to environmental receptors. Can return to original environmental conditions in less than one year.</p> <p>Moderate impact to operational complexity, a workaround can be implemented.</p> <p>Can result in a moderate, unplanned expenditure (includes asset replacement, environmental cleanup, loss of revenues and increased cost of operations and maintenance).</p>
<b>Major - 4</b>	<p>Significant Health and Safety concern, which could result in critical injuries.</p> <p>Significant Environmental Impact which is difficult to mitigate (more than one year to return to prior state) but does not result in breach of ECA or Environmental Legislation.</p> <p>Will require significant resources to provide a workaround, and/or will significantly increase complexity of operations.</p> <p>Can result in a significant, unplanned expenditure (includes asset replacement, environmental cleanup, loss of revenues and increased cost of operations and maintenance).</p>

Criticality Score	Consequence of Failure (CoF)
<b>Severe - 5</b>	<p>Failure can cause breach of compliance with Health and Safety Legislation, or immediate health and safety concerns.</p> <p>Can result in significant impact on Natural Environment which is difficult to mitigate (more than one year to return to prior state) or breach of ECA or Environmental Legislation</p> <p>If asset fails, a workaround is not possible, or is unfeasible. May result in non-compliance orders or fines, and interrupt operations for more than a week.</p> <p>Can result in a significant, unplanned expenditure (includes asset replacement, environmental cleanup, loss of revenues and increased cost of operations and maintenance).</p>

- B. Consequences of Failure fall into more than one Criticality category, the Criticality Score will reflect the higher category. For example, if Moderate environmental impacts are expected as a result of an asset failure, but only minor operational concerns are likely to result, then the Criticality Score of "Medium" shall be selected, as it represents the highest applicable consequence.
- C. Determination of Consequence of Failure will assume that the Asset or Component has failed completely and cannot be operated.
- D. Determination of Consequence of Failure shall take the process within which the Asset operated into account, and must be based on operational context including:
- Redundancy of equipment
  - Ability to meet peak operational requirement with unit out of service.
  - Availability of spare parts and complexity of replacement or repair

### 3.2 Lifecycle Category Classification

- A. All Assets and Components can be identified based on their lifecycle category, which filters assets based on their functionality and service life. The following table lists the lifecycle categories along with the typical assets associated with each.

**Table 7: Lifecycle Category Classification**

Life-Cycle Categories	Typical Assets
<b>Architectural</b>	Windows, floors, doors, roofs, exterior cladding, interior walls, and finishes.
<b>Building Mechanical</b>	HVAC, plumbing and fixtures, humidity and moisture control systems, fuel storage tanks.



Life-Cycle Categories	Typical Assets
<b>Electrical</b>	Incoming power, transformers, switchgears, diesel generators, lighting, motor control centres (MCC), equipment control panels.
<b>Process Equipment</b>	Pumps, valves, motors, and actuators.
<b>Structural</b>	Concrete, steel reinforcement, structural steel, exterior walls.
<b>Site Civil</b>	Fencing, driveways, curbing, parking lots, landscaping, grading (water ponding), sidewalks, catch basins.
<b>Health and Safety</b>	Fire extinguishers, fire cabinets, eye wash stations.

### 3.3 Criteria for Physical Tagging in the Field

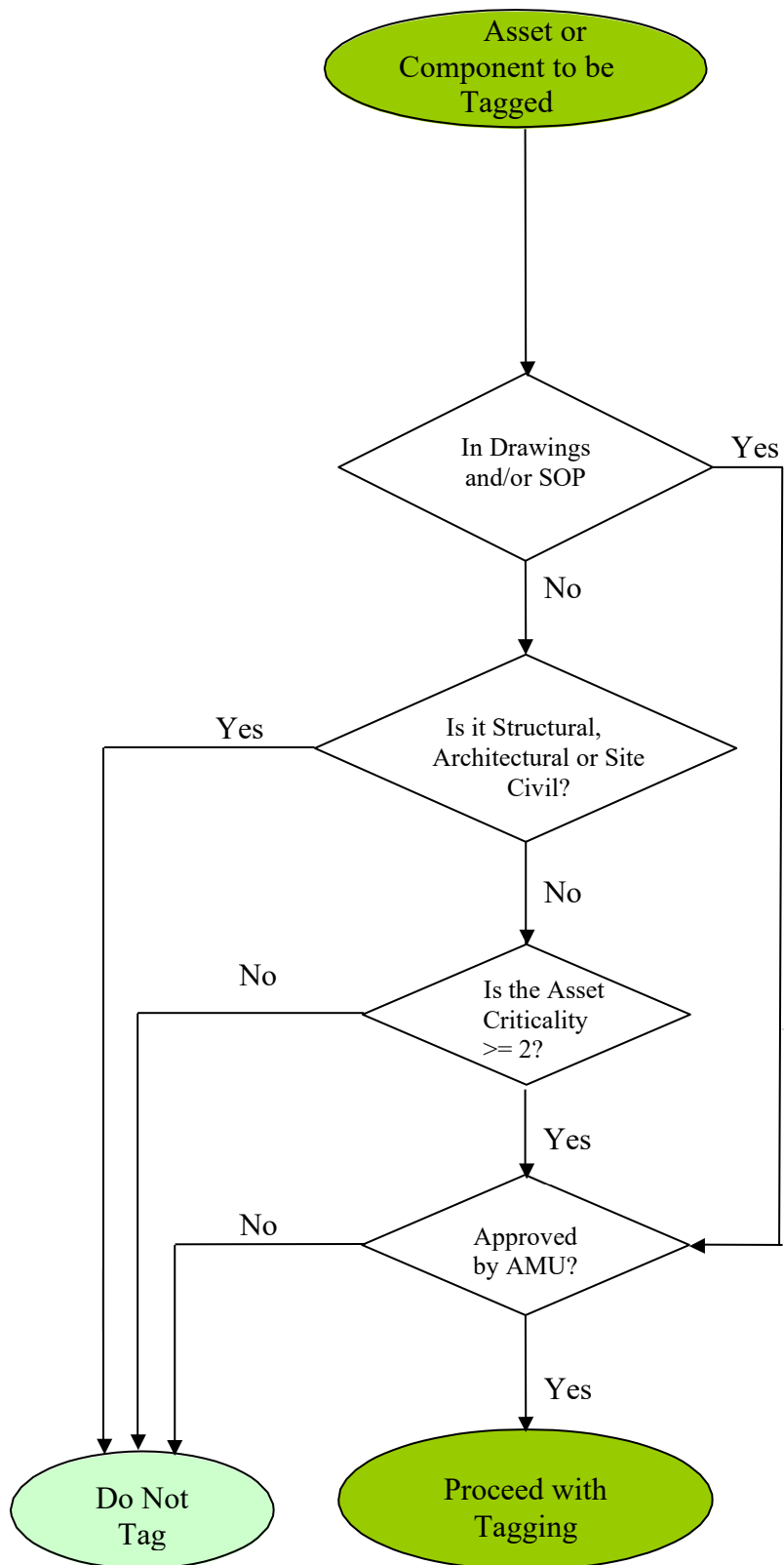
- A. Major Assets and Components should have a physical Tag attached with the unique Asset Identification Tag assigned according to this Standard.
- B. The level to which a Component is to be Tagged will depend on several factors. All the factors below should be considered when deciding if a physical Tag is needed:
  - **Criticality:** Assets / components with a Criticality (Consequence of Failure) rating of 2 and above (2 = Minor, 3 = medium criticality, 4 = major criticality, and 5 = severe criticality) are required to be physically tagged. The only exceptions are the security cameras, emergency lighting and light poles that will be tagged even though these have a criticality of 1.
  - **Lifecycle Category** of the Asset or Component: All Building Mechanical, Electrical, Process Equipment, and Health and Safety Assets shall be tagged. Structural, Architectural, and Site Civil assets shall not be tagged.
  - **Impact on Process:** If an Asset or Component is referenced in As Built Drawings and/or Standard Operating Procedures or Preventative Maintenance activities tagging will be required for ease of identification.

There are some exceptions to this rule at the discretion of SWMS team. For example:

1. There are assets in the Master Excel Tagging Sheet that were not tagged even though these assets fall within Lifecycle Category and/or Criticality criteria (e.g., piezometers, lysimeters, etc.).
  2. There are assets with the criticality score of 1 and are physically tagged (e.g., Emergency Lights and Light Poles).
  3. There are assets within the Architectural lifecycle category which are physically tagged (e.g., Overhead Doors).
- C. An Asset Grouping may be Tagged as one Asset depending on whether it supports a certain function in the Process.

- D. The focus must always be on the Asset or Component which is providing the main function.
- For example, a pump driven by a motor will be initially tagged with one Tag.
  - This one Tag will reference both the motor and the pump.
  - However, based on the Criticality Assessment or impact to the Process, it may be determined that the Motor should be Tagged separately.
- E. The decision-flow diagram in Figure 1 (on the following page), together with the above definitions, is a guide to furthermore evaluate if an Asset or Component is to be tagged.
- F. If there are further questions about Tagging an Asset or Component, contact the Asset Management Unit (AMU) for further assistance.

**Figure 1: Physical Asset Tagging Decision Flow Diagram**



### 3.4 Physical Tag Standards

- A. Tags are to be attached directly on Assets or Components. The Tag must be in plain view of a person walking by the equipment.
- B. Warranties or Asset Performance are not to be affected by the mounting of the Tags.
- C. All electrical isolation (lock-out) procedures must be followed during installation of Tags.
- D. Tags are to be attached so that the Asset Tags are easily seen by Maintenance Staff. It is also required that Asset Tags be affixed where a handheld device can scan the bar code without restrictions or difficulty.
- E. In situations where Asset is not in plain view of a person walking by it, a duplicated secondary Tag may be required as close as possible to the equipment.
- F. In situation where optimal mounting of the Tag is unclear, approvals of a mounting location must be obtained from the SWMS Asset Management Unit.
- G. Large Assets require a secondary larger Asset Tag for ease of identification from a distance for both operational and safety related requirements. Currently, a three-inch stenciling (or an appropriate size proportionate to the size of the equipment) is the approved standard. The color of the paint or Tag is to be complementary to the color of the Asset to ensure fully that it is visible from a distance.
- H. Large identification Tags are required on all Compactors, Cranes, Large Pumps, Generators, Engines, HVAC Units, Blowers, Large Motors, Large Compressors, Furnaces, Scrubbers, Large Valves, and all other similar large equipment.
- I. The Asset Management Unit will approve the material type (Anodized Aluminum Metalphoto or Lamacoid) utilized for all Tags based on the specific location.
- J. Anodized Aluminum Metalphoto is required on all Asset and Components in non-corrosive locations, all Asset and Components that may be painted, and for outdoor installations. Although reliable for tag usage, Stainless Steel has been noted to have barcode scanning issues during consultation with City of Toronto staff. This is a result of the high reflectivity of the material and the low contrast it provides to barcodes. A barcode scanning requires the reading of light and dark columns to process information, they typically require 80% or higher contrast between the light and dark columns.
- K. Lamacoid Tags are required on all control panels and electrical switches, and on assets in corrosive environments.

### 3.5 Tagging Practices

- A. Performance and Quality Goals - The recommended practice for installing Tags is based on meeting these key objectives:
  - List down Assets that need Tags for the Site.
  - Generate a list of assets to be tagged as per the template shown in Appendix A (site, Process, subprocess, asset location, etc.) and review with AMU/Site Representative.
  - List method of affixing the Tags for each Asset (Riveting, Hanging, Gluing or Hard to Reach/Inaccessible Equipment)

- Ensure that material and tagging method is appropriate.
- Schedule time to install tags without disruption to normal operations.
- Follow all site regulations regarding Health and Safety and Safe Work Practices during Tag installation.
- Ensure equipment is "Locked Out and Tagged Out" by City Employee before any work is done and that all Safe Working Procedures are adhered to.
- Tag must be mounted close to existing Manufacturer's nameplate Tag where possible.
- Tag must be installed in such a manner that it indicates which Asset it is naming.
- Tag must not interfere with safety and operational functionalities of the asset.
- Ensure that the Asset is operational and safe after it has been Tagged.
- Remove or cover existing Identification Tags or Labels where identification is conflicting and record any historical names in the Asset Inventory. Do not cover or remove any labels which reference Safety Instructions or Warnings
- Clean workspace after installation.
- Once the project is complete, send the revised list of newly or revised tagged assets, any new or revised engineering drawings and additional comments to Asset Management Unit (AMU). (cc: Senior Engineer and Research Analyst).

B. Crew Requirements - Contractor will execute this practice with the assistance of City Staff. Qualifications for the Contractor's crew are listed below.

#### **Crew Skill Requirements**

Crew	Skills Required
Contractor	Licensed Millwright <ul style="list-style-type: none"> <li>• Must be familiar with requirements of the Occupational Health and Safety Act and its regulations for the safe performance of his/her duties.</li> </ul>

- C. Mount Tags so that they are visible and legible. Place Tags within a height range of 1200mm to 1650mm (4 to 5 ½ feet) from the floor if possible. Do not obscure or mount over other nameplates, labels, or Tags. Attempt to locate the Tags as close as possible to existing Manufactures nameplate Tags.
- D. For surface mounted equipment, mount with Stainless Steel Screws, Stainless Steel Rivets, or double-sided industrial adhesive as appropriate.

### **3.6 Tagging Methods**

- A. Example of a Tag affixed by rivets is presented in Figure 2 (on the following page). Example photo is from a Toronto Water application and is depicted only to illustrate fastening method.
- B. Riveting must occur in such a way as not to void Warranties or to interfere with the Asset's Performance or damage the Asset in any way.

**Figure 2: Affixing a Tag**



- C. Hanging of Asset Tags should occur onto equipment where Tags cannot be riveted for reasons of visibility, accessibility, or practicality.
- D. Example of a Tag affixed by Hanging is presented in Figure 3 below. Example photo is from a Toronto Water application and is depicted only to illustrate fastening method.

**Figure 3: Hanging a Tag**



- E. Gluing of Asset Tags onto equipment where Tags cannot be riveted for reasons of visibility, accessibility or practicality is acceptable where Hanging will not work. For example, for affixing Tags into an existing Electrical Panel Door

**Figure 4: Gluing A Tag**



- F. Where Equipment is hard to reach or is Inaccessible, and any of the Tagging Practices cannot be applied, Tags may be affixed in a location close to the equipment. Location must be approved by Asset Management Unit and must clearly denote which Asset it applied to.



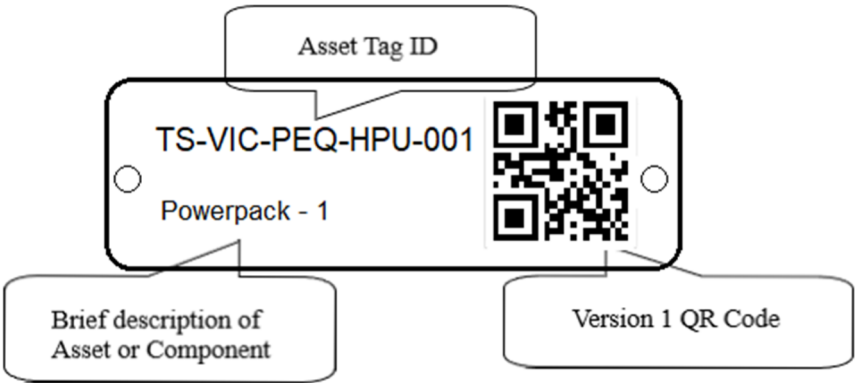
**Figure 5: Tag Affixed on the Wall For Ceiling Asset**



**3.7 Physical Tag specifications**

- A. All Assets will have a Standard Asset Tag layout (shown below)

**Figure 6: Standard Asset Tag Layout**



- B. The Tag Layout must follow the Specification of:



- The Asset Tag ID
  - A QR code representing the unique Asset Tag, on the left of the Asset Tag and meeting Specifications found in Physical Tag Specifications Table below.
  - A brief description of the Asset or Component type
- C. The Asset description may require a functional detail in order to better identify the Asset function and define which Process the Asset supports. For example:
- Pump (no function necessary)
  - Motor (no function necessary)
  - Compressor, Service Air (the function tells the reader it is a service air compressor – not fire suppression)
- D. Tags and Fasteners Specifications are listed in the Table below. Any Tags which do not meet these specifications will require approval by the AMU before being installed.

**Table 8: Physical Asset Tag Specifications**

Size	1" x 3" (all Assets and Components)
Thickness	<ul style="list-style-type: none"> <li>• Anodized Aluminum (Metalphoto): 0.032"</li> <li>• Lamacoid: 0.0625"</li> </ul>
Material	Anodized Aluminum (Metalphoto) or Lamacoid
Coating	3M Teflon UV and Aluminum Oxide (Aluminum Only)
Fastener hole size	1/8"
Fastening Method	<ul style="list-style-type: none"> <li>• Specified rivets only (unless approved by AMU)</li> <li>• 1/16" polished galvanized steel wire cable with swaged coupling</li> <li>• Industrial grade 3M #468 adhesive</li> </ul>
Rivet Specifications	1/8" SS round head or blind SS pop rivets
Asset Tag ID Font	Arial TT, bold, black, Uppercase 2.95 - 3.1 points
Asset Description Font	Arial TT, bold, black, 2.7 – 2.8 points
QR Code Size	0.75"x 0.75"

- E. All former or conflicting references to Asset and Components Tags must be removed once new Asset Tag is installed to ensure no ambiguity as to the correct Tag Identification. The exception is at Sites where Electrical Equipment has been Tagged as part of the Arc Flash Project. For this equipment, the Asset Tag must be affixed along with the Arc Flash Tag, and the Asset Tag ID must match.

APPENDIX A - ASSET INVENTORY INFORMATION REQUIREMENTS

FOR ALL ASSETS AND COMPONENTS

Asset Hierarchy						Asset Identification							Asset Information				
Level 3 - Site	Level 4 - Functional Area / Operations	Level 5 - Section / Processing Area or Equipment	Level 6 - Subunit / Major Asset	Level 7 - Component Asset	Level 8 - Subcomponents	Asset ID	Asset Tag / Component ID	Asset Location	Asset/ Component Description	** Asset / Component Category	Drawing Number	Criticality (1-5)	Historical Identifications and Tags	Year of Construction / Installation	Manufacturer	Model	Serial Number

\* Asset Hierarchal Structure provided above defines the categories for each level of the asset hierarchy \*\* Asset / Componet Category shall be either Civil, Architectural, Structural, Electrical, Mechanical, or Instrumentation

ASSET CONDITION AND VALUATION INFORMATION

Asset Condition and Value						Minor Rehabilitation Information						Major Rehabilitation Information					
Condition Score (1-5)	Condition Notes	Performance Notes	Estimated Remaining Service Life	Total quantity, length (ft) or area (sqft) of asset	Total Estimated Replacement Value (\$)	Year of Planned Minor Rehabilitation	Condition at time of Minor Rehabilitation	Description of Minor Rehab Activities	Cost of Minor Rehabilitation (\$)	Condition following Minor Rehabilitation	Recommended frequency of subsequent Minor Rehabilitations	Year of Planned Major Rehabilitation	Condition at time of Major Rehabilitation	Description of Major Rehab Activities	Cost of Major Rehabilitation (\$)	Condition following Major Rehabilitation	Recommended frequency of subsequent Major Rehabilitations

ADDITIONAL ASSET-SPECIFIC INFORMATION (TO BE COLLECTED IN ADDITION TO THE ALL-ASSETS INFORMATION FOR THE SPECIFIC ASSET)

Asset Type

Building	Building Use (Admin, Storage, Process)	Size (sqft)	Number of Stories																											
Room	Room Use (Storage, Electrical)																													
Roof	Roof Level	Roof Material Type (e.g. asphalt, modified bitumen)	Size (sqft)																											
Foundation	Construction Type (e.g. blocks)																													
Exterior Wall	Wall Section	Construction Type (pre-cast, panels)																												
Tip Floor	Level	Construction Type (slab-on-grade, suspended)	Size (sqft)																											
Compactor	Bulk Head (Roller/Sliding)	Arms Type (hydraulic/penuma tic)	Number of Limit Switches	Wear Wall Plates Size)	Length of Cylinder	Length of Travel	Size of Wear Strip	Rear Pin Size	Bulkhead Pin Size																					
Compactor Powerpack	Pump Capacity	Motor (HP)	Sol. Valve	Relief Valve	Heat Exchanger (Air/Water Cooled)																									
Weighscale	Number of Load Cells	Weight Rating	Certification Status	Monitoring																										
HVAC	Type (Draw-Thru or Blow-Thru)	CFM Rating	Belt Size and Quantity	Filter Type Description	Filter Dimensions and #	Evaporator Style	Evaporator Dimensions	Humidification Info.	Compressor Name Plate Info.	Damper Info.																				
Boiler	Rating (BTU)	Boiler Chemicals	Circulation Pump Details																											
Fan/ Blowers	Impeller/ Propeller Diameter	Impeller/ Propeller Material	Function (e.g. exhaust)	Rotation (CW/CCW)	Unit Used for HVAC (Yes or No)	Interlocked with Fire System (Y?N)	Size of Belt	Fan Pulley Size	Type of Disconnect																					
Compressor	Type	Capacity	Belt Size	Filter Type Description	Filter Dimensions and #																									
Motor	Motor Function	Serial Number	Voltage	Amperage	Horse Power	RPM	AC or DC	Cycles (NZ)	Number of Phases	Special Features	Mount, (Horizontal, Vertical)	Shaft (Single or Double Output)	Additional Nameplate Info	Type of Disconnect	Location of Main Disconnect/ Breaker															
pump	Flow Rate (L/sec,USgpm,IMg pm)	RPM	Number of Stages	Impeller Material	Impeller Diameter	Number of Impeller Vanes	Drive (Direct, Belt or Gear Box)	Coupling Type and Size	Belt Type and Size																					

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valve	Process Application	Valve Type	Connection Type	Valve Size	Body Type	Pressure Rating	Number of Rotations	Operator Manufacturer	Operator Type	Operator Model Number	Operator Size
Breaker	Voltage	Current	No. Poles, No. Wires	Main Breaker Frame	Incoming Cable Size	No. Wires					
Transformer	Voltage	Secondary Voltage	Primary Connection	Secondary Connection	Power Rating						
Panels	Voltage	Current	Phases	Main Breaker Frame	Incoming Cable Size	No. Wires					
Flow Meter	Diameter	Min. Flowrate (L/sec,USgpm,IMgpm)	Max. Flowrate (L/sec,USgpm,IMgpm)								
Disconnect Switch	Voltage	Current	Phases	Fuse Size	Incoming Cable Size						
Sprinkler System	Type (Wet/Dry)	Fire Pump	Jockey Pump	Valve	Main Pipe Size	Sprinkler Head Details					
Overhead Door	Motor Details	Door Height (m)	Door Width (m)								
Dust and Odour Control	Pump Detail	Chemicals Details	Heads Details								
Watermains	Material	Length (m)	Diameter (mm)								
Sewers	Material	Length (m)	Diameter (mm)								
Catchbasins	Material	Depth (m)	Diameter (mm)								
Gas Collection Header	Material	Length (m)	Diameter (mm)								
Condensate Pit	Material	Dimensions (L x W x H)									
Gas Collection Well	Casing Material	Well Diameter (mm)	Well Depth (m)								
Leachate Collection Well	Casing Material	Well Diameter (mm)	Well Depth (m)								