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#### PLANNING AND ENGINEERING GUIDELINES & STANDARDS (PEGS) SUPPLEMENT NUMBER: PEGS-22-003

#### MAY 27, 2022

#### VOLUME 1, AIRPORTAL, CHAPTER 6, ASSET MANAGEMENT

A. Volume 1, Chapter 6, Section 6.0, Introduction to MDOT MAA's Asset Management Program

- B. Volume 1, Chapter 6, Section 6.1, Facility Condition Assessments
- C. Volume 1, Appendix 1H1, Facility Assessment Inspector Checklist

Effective immediately, the following modification shall be made to the MDOT MAA 2022 PEGS Manual:

#### A. Volume 1, AIRPortal

- 1. Add new Chapter 6, Asset Management
- 2. Add new Chapter 6, Section 6.0, *Introduction to MDOT MAA's Asset Management Program (Attachment 1).*
- 3. Add new Chapter 6, Section 6.1, Facility Condition Assessments (Attachment 1).

#### **B.** Volume 1, AIRPortal

- 1. Add new Appendix 1H, Asset Management Appendix
- 2. Add new Appendix 1H1, Facility Assessment Inspector Checklist (Attachment 2).

Consultants listed herein are required to distribute this PEGS standard supplement to their respective staff and subconsultants.

If you believe this standard supplement conflicts with any other codes or regulations or if you should have any questions regarding this matter, please contact the Manager, GIS & Engineering Technology Section at (410) 859-7768.

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Tom Varughese, P.E., Director Division of Planning and Engineering Office of Engineering and Construction

PEGS Supplement: PEGS-22-003

- A. Volume 1, Chapter 6, Section 6.0, Introduction to MDOT MAA's Asset Management Program
- B. Volume 1, Chapter 6, Section 6.1, Facility Condition Assessments
- C. Volume 1, Appendix 1H1, Facility Assessment Inspector Checklist Page 2

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#### DISTRIBUTION

Attachments:

- 1. Chapter 6, Section 6.0, Introduction to MDOT MAA's Asset Management Program (attachment 1)
- 2. Chapter 6, Section 6.1, Facility Condition Assessments (Attachment 1)
- 3. Appendix 1H1, Facility Assessment Inspector Checklist (Attachment 2)

PEGS Supplement: PEGS-22-003

- A. Volume 1, Chapter 6, Section 6.0 Introduction to MDOT MAA's Asset Management Program
- B. Volume 1, Chapter 6, Section 6.1 Facility Assessments at MDOT MAA
- C. Volume 1, Appendix 1H Asset Management Appendix

Page 3

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## **ATTACHMENT 1**

Volume 1, Chapter 6, Asset Management

Section 6.0, Introduction to MDOT MAA's Asset Management Program

Section 6.1, Facility Condition Assessments

## 6.0 Introduction to MDOT MAA's Asset Management Program

In 2018, the Maryland Department of Transportation began a strategic initiative to formalize an asset management program to guide transportation decision-making and investments for MDOT, its five transportation business units, and one authority. Per MDOT's Strategic Asset Management Plan, asset management is considered an integrated set of processes to minimize the lifecycle costs of infrastructure assets, at an acceptable level of risk, while continuously delivering established levels of service. Asset management is a holistic approach of balancing costs, opportunities, and risks against the desired performance of assets.

MDOT MAA has been actively participating in all aspects of MDOT's asset management initiative. MDOT MAA developed an asset management plan to assess its current practices and develop a strategy to normalize activities throughout the organization to establish a true asset management program. MDOT MAA is dedicated to developing an asset management process based upon quality information and a documented, structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions to help achieve and sustain a desired state of good repair (SGR) over the lifecycle of the assets at minimum practicable cost.

The MDOT Strategic Asset Management Plan's goals and strategies are centered around seven key assets: (1) facilities, (2) pavement, (3) structures, (4) tunnels, (5) rail, (6) vehicle fleet and equipment, and (7) major IT systems. One of those goals is to conduct inventories and assessments for all major assets.

## **6.1 Facility Condition Assessments**

MDOT developed guidance for the transportation business units to assess and report on the condition of facilities in the MDOT Facility Condition Assessment Manual and MDOT MAA began performing building inspections following this guidance in 2018. Work has continued since, and MDOT MAA has plans to inspect about 25% of its facilities each year. MDOT MAA developed a field collection tool using Esri's Collector for ArcGIS to support facilities assessments as well as tools to calculate system scores and derive an overall building condition score. The calculations made by the tools come directly from the MDOT Facility Condition Assessment Manual and generate facility data required for annual reporting to MDOT.MDOT utilizes facility condition scores, along with criticality rankings, as part of its criterion for future funding decisions.

# 6.1.1 Facilities Condition Assessment Data Collection Requirements

MDOT MAA relies on consultants to perform annual facility assessments. Consultants that are tasked with performing facility assessments must adhere to the guidance in the MDOT Facility Condition Assessment Manual. During project scoping and throughout the project execution, the consultant must coordinate inspection and data collection activities with the GIS and Engineering Technology Section (GETS), Asset Management Manager. Additionally, they must use MDOTMAA's Esri Collector for ArcGIS application that is configured to perform the facility condition assessments. Consultants unfamiliar with Esri Collector for ArcGIS application shall require staff toparticipate in MDOT MAA-provided training sessions. Information on using this application can be foundin Section 6.1.2 Facility Assessment: Collector Application Guide.

Information for consultant GIS staff responsible for supporting the facility assessments can be found in Section 6.1.3 Facility Assessment Application - GIS Analyst Guide.

Prior to beginning field work, consultants should refer to the Appendix 1H.1 Facility Assessment Inspector Checklist to ensure a complete and successful facility assessment. Following each facility assessment, consultants shall perform quality control checks to ensure all required information was captured. The consultants shall run the MDOT MAA provided tools to generate system scores and an overall building condition score. As a project deliverable, consultants must submit facility data that complies with PEGS V1, Chapter 4 GIS Standards. The final data shall delivered to MDOT MAA's GIS and Engineering Technology Section, Asset Management Manager.

#### 6.1.2 Facility Assessment: Collector Application Guide

The Collector for ArcGIS application was configured to facilitate the MDOT MAA facility assessment teams with data collection in the field. This application will allow MDOT MAA to fill in knowledge gaps and provide geospatial information for assets included in the facility assessments. This data will be utilized by MDOT MAA's GIS and Engineering Technology Section and incorporated into Maximo, MDOT MAA's asset management system.

#### 6.1.2.1 Working Online and Offline

Users should perform their work online, meaning that their tablet is connected to the internet via cellular network or WIFI. This ensures data is automatically uploaded to the cloud and reduces the potential for data loss.

If necessary, due to an inability to connect to the internet or lag time due to a slow connection, individuals may take copies of the facility assessment map offline. When working with offline maps, the user must sync data as soon as they are connected to the cellular network or WIFI. At a minimum, the user must sync data at lunch and at the completion of the field event day. Any data lost due to a failure to sync data in a timely manner will be the responsibility of the user. If the user receives a sync error, they should contact the GIS analyst providing technical support to the consultant team. Users should not delete any offline area, photo, or application until a successful data sync has been confirmed.

#### 6.1.2.2 General Use

#### A. Opening the Map

Users will open Collector for ArcGIS on their tablet and sign into their ArcGIS Online account. In the Map screen, the user will see the Facility Assessment Map for their assessment team. Tap on this map to open. (Offline maps should be pre-loaded on to the user's device. If for some reason the user does not see an offline map, please reference the section on Taking Maps Offline on page 3).

Once in the map, the user can select the three dots in the top right-hand corner. This will show a drop down for "Layers", "Bookmarks", "Basemap", "Measure."

- 1. When the user selects "Layers," they will see the "Map Layers" screen by default. This is a list of all the layers in the map. These layers may be toggled on and off. In the Layers menu, the user can press "Legend" to open a list of all the symbols.
- 2. When the user selects "Bookmarks," they will see bookmarks for each building. Selecting one of these bookmarks will zoom the Collector app to the building of interest.
- 3. When the user selects "Basemap," they will see other basemap options. This is only available to online maps.
- 4. When the user selects "Measure", they will be able to access the measuring tool.
- B. Creating an Assessment Point

In the Collector application, assessment points represent the location of an asset, room, or building

for which a user will complete an assessment. Prior to the field event, the user should be familiar with the Assessment Level Matrix, found on page 4, to ensure assessments are completed at the correct level of granularity: asset level, room level, or building level. Below are the steps for creating a new assessment point.

To create a new Assessment Point:

- 1. Click the + sign in the bottom right of the screen. A circle with a + sign will appear on the center of the screen over the users' location.
- 2. On the left side of the screen, the user will see a window with the possible assessment point types—asset, room, or building. Tap the appropriate assessment point type. This will open the Assessment Point editing window.
- 3. On the map, the user will see the circle and + sign. Move the + sign to the appropriate location for the assessment point and tap "Add Point." The user will now see the assessment point icon on the map.
- 4. On the left side of the screen, the user will see the assessment point editor window. The user will enter data for all fields where appropriate. Fields with an asterisk (\*) are required. Required fields cannot be left blank; the Collector app will not allow the user to submit the point without the required information.
- 5. The user can take photos of the asset, room, or building to provide context. These photos are of the asset/room/building, and not for documenting damage or condition. Photos will be taken with a landscape orientation and the home button to the right of the screen. If the user takes photos of identification tags, make sure these identification tags are legible.
- 6. When complete, press "Submit."
- C. Completing an Assessment

In the Collector application, each of the eleven (11) systems has an assessment table. Per the MDOT Facility Assessment Manual, assessments are visual assessments of components or subsystems, depending on the system. Below are the stops for creating a link from an assessment point to a system assessment table and recording the assessment.

To create a new system assessment:

- 1. On the map, tap on the assessment point of interest. This will open the asset's pop-up window.
- 2. Tap on the link icon. This will open the "Select Relationship" window.
- 3. Tap the appropriate System Assessment table. This will open a new window.
- 4. Tap add to create a new record in the System Assessment table. This will open the System Assessment table editor window.
- 5. The user will enter data for all fields where appropriate. Fields with marked with an asterisk (\*) are required. Required fields cannot be left blank; the Collector app will not allow users to submit the point without the required information.
  - a. Assessment values are required fields. Each asset ranking must be a percentage 0-100, and all score levels 1-5 must add up to 100%.
  - b. Take photos if applicable. Photos are taken to document condition or damage to asset. Photos will be taken with a landscape orientation and the home button to the right of the screen.
- 6. When complete press "Submit."
- 7. The left panel will show all the assessment information the user entered. Scroll through the entries and confirm accuracies of record information.
  - a. Confirm the status fields says "Complete." If the percentages add up to greater than

100%, the user will see the error message "Error Total Exceeds 100%." If the percentage are less than 100%, the user will see "Incomplete."

#### 6.1.2.3 Taking Maps Offline

If necessary, maps can be taken offline. This means a copy of the map is downloaded onto a user's device. Edits made to the map are made locally on the device and must be periodically synced to upload this data to the cloud.

The following steps outline the process of taking a map offline.

- 1. Open the Collector application and locate the map of interest.
- 2. Tap the three dots "..." next to the map name. This will open a window that allows users to select "Map" Details" or "Add Offline Area."
- 3. Tap "Add Offline Area". This will open the Add Offline Area Map.
- 4. Zoom to the area of interest and tap the "Download Area" Button. This will start the download process.
- 5. Once the download is complete, the user will be able to open the offline map and start recording data.

The following steps outline the process for syncing data from an offline map. The user can sync data two ways. The first option for syncing data is outside of the map.

- 1. Open the Collector application and locate the map of interest and tap. This will open a screen that shows users the areas that have been downloaded locally onto the device.
- 2. Locate the area of interest and tap the three dots ("...") next to the Area name. Three options will appear: "Sync", "Rename Area", or "Remove Area."
- 3. Select "Sync", a load icon will appear where the three dots ("...") once were. When the sync is complete, the load icon will revert to the three dots.
- 4. If there is a technical sync error, contact the GIS analyst providing technical support to the consultant team. Do not delete or remove any photos, downloaded areas or applications from the device.

The second option for syncing data is done directly in the download area map itself.

- 1. In the Downloaded Area Map, locate the sync button, two arrows pointing in opposite directions and tap this button. This will open the sync window.
- 2. Press the sync button to initiate the syncing process.
- 3. If there is a technical sync error, contact the GIS analyst providing technical support to the consultant team. Do not delete or remove any photos, downloaded areas or applications from the device.

#### 6.1.2.4 Assessment Level Matrix

The Assessment Level Matrix identifies whether a subsystem or component should be assessed at the building, room, or asset level. An asterisk (\*) indicates an MDOT MAA asset. Please note that some components are part of an asset. Components that make up an MDOT MAA asset do not need an individual assessment point. Their assessments should be attached to the MDOT MAA Asset point.

The final column, Inspector, indicates which inspector group is responsible for completing the assessment. In some instances, two inspector groups may be responsible for assessing the same subsystem or component.

Assessment			Level of Gra	anularity	y		la su s st su
System	Subsystem	Component	Building	Room	Asset	TBD	Inspector
Substructure	Foundation	All Components	V				STRUCT
Substructure	Basement	All Components	V				STRUCT
	Superstructure						STRUCT
Assessment System Substructure Shell Interiors Conveyance Plumbing	/Structural	All Components	V				All, ARCH
	Frame						Walls
Shell	Roof	All Components	$\checkmark$				ARCH
Assessment System Substructure Shell Interiors Conveyance Plumbing	Exterior	All Components	$\checkmark$				ARCH
	Shell Appurtenances	All Components	V				ARCH
	Partitions	-		V			ARCH
Intoniono	Ctoire			- /			ARCH &
Assessment System Substructure Shell Interiors Conveyance Plumbing	Stairs	-		v			STUCT
	Finishes	-		V			ARCH
	Flourstor*				.,		ARCH &
Conveyance	Elevator	-			v		ELEC
	Facelater*	-			.,		ARCH &
	Escalator				v		ELEC
	ı :f+*						ARCH &
		-			v		ELEC
		Appliances		V			MECH
Shell Interiors Conveyance Plumbing		Sinks		v			MECH
		Toilets/Urinals		V			MECH
	Fixtures	Drinking Fountains		v			MECH
		Faucets/Supply					
		Lines		v			IVIECH
		Drainage Pipes		v			MECH
		Piping		V			MECH
Water Boost	Water Heater*			v		MECH	
Plumbing	Distribution	Booster Pump*			V		MECH
Fiumbing	Distribution	Well*			v		MECH
		Well Pump*			٧		MECH
		Ejector/Grinder			<b>N</b>		МЕСН
		Pump*			v		IVIECH
		Wastewater					
	Sanitary Wasto	Treatment Package			v		MECH
	Sanitary waste	Plant*					
		Septic Tank*			V		MECH
		Septic Field*			٧		MECH
		Piping		V			MECH

Assessment			Level of Granularity				
System	Subsystem	Component	Building	Room	Asset	TBD	Inspector
		Oil-Water Separator*			v		MECH
	Rain Water Drainage	-	V				MECH
		Electrical Conduit				٧	ELEC
	Energy Supply	Fuel/Gas Line				٧	MECH
		Boiler*			٧		MECH
нулс	Heating/Cooling	Cooling Tower*			V		MECH
	Generation and	Air Handler*			٧		MECH
	Distribution	Chiller*			٧		MECH
	System	Piping		v			MECH
HVAC	Testing,	Valves				٧	MECH
	Balancing,	Dampers				٧	MECH
	Controls, and	Sensors				٧	MECH
	Instrumentation	Instruments				٧	MECH
		Fans			٧		MECH
	Chimneys/Vents	Ductwork		v			MECH
		Flues/Cleanout/Caps			٧		MECH
	Electrical	Incoming Service				٧	ELEC
	Service and	Panels and			./		
	Distribution	Breakers*			v		ELEC
Electrical		Wiring		V			ELEC
	Lighting and	Fixtures		v			ELEC
Generator)	Branch Wiring	Switches and Receptacles		v			ELEC
	Other Electrical	Lightning Protection	٧				ELEC
	System Related Elements	Emergency Lighting	٧				ELEC
	Crawinghila an	Piping		٧			MECH
	Sprinklers	Heads		V			MECH
	Ctandnings*	Piping			٧		MECH
	Standpipes*	Hose Connection			٧		MECH
Fire		Hydrants*			٧		MECH
Protection	Hydrants and	Tank*			٧		MECH
	Other Fire	Compressor*			٧		MECH
	Protection	Valve*			٧		MECH
	Specialties	Controls*			V		MECH
		Annunciators*			V		MECH
Socurity		Sensor*			V		ELEC
Security	-	Camera*			V		ELEC

Assessment	ssessment			Level of Granularity				
System	Subsystem	Component	Building Room		Asset TBD		inspector	
		Controls*			V		ELEC	
		Annunciators*			V		ELEC	
	Lifts*	-			N		ELEC &	
Equipmont					v		ARCH	
Equipment	Cranes*	-			v		ELEC &	
				v	v		ARCH	
Generator	Generator*	-			V		ELEC	
	Transfer Switch*	-			v		ELEC	

### 6.1.3 Facility Assessment Application (ArcGIS Online/ArcGIS Pro) – GIS Analyst Guide

#### 6.1.3.1 Purpose

This document is intended for a GIS analyst providing technical support for MDOT MAA facility assessments. It provides information on how the facility assessment application is architected in ArcGIS Online and it outlines the steps necessary to process data after field collection is complete for input into the MDOT Excel spreadsheet.

#### 6.1.3.2 Getting Started

Below is a list of items that must be completed by the GIS analyst before field work can commence.

Item	Description/Action	Refe	erences
ArcGIS Online for Maryland account	The GIS analyst providing technical support must have an ArcGIS Online for Maryland account. Request an account by completing the MDOT-specific application. It requires the GIS analyst to have an MDOT or MAA email address.	<u>http</u> 289a	<u>s://survey123.arcgis.com/share/9f</u> ad6a8f4449d8622fe98a8dcb987
MAA Facility Assessment group in ArcGIS Online	The GIS analyst must be added to the MAA Facility Assessment group in ArcGIS Online. To request access, contact the GIS & Engineering Technology Section (GETS) GIS Analyst at <u>airportal@bwiairport.com</u> .	<u>http</u> <u>me/</u> bed2	s://maryland.maps.arcgis.com/ho group.html?id=91559c703c7640f6 2c3a31644a136#overview
Updated floor	The GIS analyst must request	1	BWI_Campus_Floor_Number_0
plans (lines	updated floor plans for BWI and	2	BWI_Campus_Floor_Number_1
and room	MTN via the Digital Data Request	3	BWI_Campus_Floor_Number_1a
polygons) for	Form available in <u>AIRPortal</u> in the	4	BWI_Campus_Floor_Number_2
BWI and MTN	Planning and Engineering	5	BWI_Campus_Floor_Number_2i

Item	Description/Action	Refe	erences
	Reference Library (PERL) > PEGS	6	BWI_Campus_Floor_Number_3
	v1-AIRPortal.	7	BWI_Campus_Floor_Number_4
		8	BWI_Campus_Floor_Number_5
	To the right is the complete list of	9	BWI_Campus_Floor_Number_6
	BWI and MTN consolidated	10	BWI_Campus_Floor_Number_7
	floorplans.	11	BWI_Campus_Floor_Number_8
		12	BWI_Campus_Floor_Number_9
		13	BWI_Campus_Floor_Number_B
		14	BWI_Campus_Floor_Number_M
		15	MTN_Campus_Floor_Number_1
		16	MTN_Campus_Floor_Number_2
		17	MTN_Campus_Floor_Number_3
		18	MTN_Campus_Floor_Number_4
		19	MTN_Campus_Floor_Number_5
		20	MTN_Campus_Floor_Number_M

Item Description/Action		scription/Action	References
	1	2019- 2020_Facility_Assessment_New- ARCH (Web Map)	Linked tables: • ShellAssessment • InteriorsAssessment • EquipmentAssessment • ConveyanceAssessment
Web Maps to be used by field inspectors for collection via ArcGIS Collector. These are shared with the MAA	2	2019- 2020_Facility_Assessment_New- ELEC (Web Map)	Linked tables: • SecurityAssessment • HVACAssessment • GeneratorAssessment • EquipmentAssessment • ElectricalAssessment • ConveyanceAssessment
Facility Assessment group in ArcGIS Online.	3	2019- 2020_Facility_Assessment_New- MECH (Web Map)	<ul><li>Linked tables:</li><li>PlumbingAssessment</li><li>HVACAssessment</li><li>FireProtectionAssessment</li></ul>
	2019- 4 2020_Facility_Ass STRUCT (Web Ma	2019- 2020_Facility_Assessment_New- STRUCT (Web Map)	Linked tables: • SubstructureAssessment • ShellAssessment • InteriorsAssessment

#### 6.1.3.3 Setting Up the ArcGIS Collector Application

- 1. In ArcGIS Pro, a single point feature class and related tables have been created for each system.
  - a. **Point Feature Class** this will be the geographic location of the "thing" that is being assessed. It will be either a room, asset, or building. This does not contain the inspection information, just location and brief description of the thing
    - i. Level of Assessment identifies the granularity of the assessment, it can either be at the asset, room, or building level, the symbology is based on the level of assessment
    - ii. Preloaded points (if points are not present or need to be spatially adjusted to fit the updated floor plans, create per the following):
      - 1. Load a building point for each building drop a point at the front door of the building and fill out all attribute information for the building
      - 2. Load room points provide a point for each room. Where possible, include attribute information, suggest either door number or space unit centroid
    - iii. Enable Attachments photos will be of the "thing" rather than the condition

#### Assessment\_Point Schema

Field Name	Alias	Туре
MAXIMO_ID	Maximo ID	Text
FEATURE_NAME	Name	Text
FEATURE_DESCRIPTION	Description	Text
ASSESSMENT_LEVEL	Assessment Level	Text
BUILDINGID	Building ID	Text
FLOORNUMBER	Floor Number	Text
UNIT	Space Unit Number	Short
DOORNUBMER	Door Number	Text
GlobalID	GlobalID	GlobalID

b. **Assessment Tables** – Each system will have an assessment table (11 total) that will store all inspection information

Field Name	Alias	Туре
OBJECTID	OBJECTID	ObjectID
SYSTEM	System	String
SUBSYSTEM	Subsystem	String
COMPOENT (if applicable)	Component	String
DESCRIPTION	Description	String
ASSET5	5 – Excellent	Small Integer
ASSET4	4 – Good	Small Integer
ASSET3	3 – Adequate	Small Integer
ASSET2	2 – Marginal	Small Integer
ASSET1	1 – Poor	Small Integer
CRITICALITY	Criticality to System	Small Integer
INSPECTOR_COMMENT	Inspector's	String
	Comment	
PARENTGUID (relationship	ParentGUID	GUID
class)		
Score	Score	Double
Range	Range	Double
GlobalID (attachment)	GlobalID	GlobalID
CreationDate	CreationDate	Date
(automatic editor fields)		
Creator (automatic editor	Creator	String
fields)		
EditDate (automatic editor	Editor	Date
fields)		
DUPGUID	DUPGUID	String
(for preserving the		
ParentGUID)		

i. For System field – set the default value to the appropriate system name

- c. Domains are used for the following fields:
  - i. Assessment Level: Asset, Building, Room
  - ii. BuildingID: List all buildings numbers in the Code and Descriptive name in the description
  - iii. Floor\_Number: For Code: 1, 2, 3, 4, 5, M, NA, R For description: 1<sup>st</sup> Floor...Mezzanine, Not Applicable, Roof
  - iv. Component\_XSystem: For each system write the "Subysystem-Component", use a shortened version in the code and longer version in the description
  - v. Subsystem\_XSystem: For each system, list all subsystems
  - vi. Range: 0-100 domain range
  - vii. Criticality: For Code: 1, 2, 3 For Description: 1 Minor, Failure has minimal impacts, 2 Major, Failure has moderate adverse impacts, 3 Critical, Failure has significant adverse impacts
  - viii. YES\_NO: Yes, No
- 2. The Point and Assessment tables exist in ArcGIS Online.
  - a. This has been published as Assessment Point\_new
- 3. The Feature Layer (hosted, view) for each level of the buildings at BWI/MTN.
  - a. These have been created for 1<sup>st</sup>, 2<sup>nd</sup>, Mezzanine, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, and roof
  - b. If the building has more levels, the GIS analyst will need to create another hosted view.
    - i. To do that, click on the Assessment Point\_new (hosted) in ArcGIS Online. On the Overview Page, press "Create View Layer"
      - 1. Give it a name and appropriate metadata. Then press OK.
      - 2. This will open the Hosted View Layer, go to the Visualization Window.
- 4. Create inspector web maps.
  - a. Create bookmarks for buildings and airports.
  - b. Add all hosted layer views for the appropriate buildings
  - c. Remove tables that do not relate to that inspector's discipline to declutter map.
  - d. Configure popups. Hide subsystem for component level assessments, use split function for post processing of the data to extract the subsystem from the component field
- 5. Share all hosted layers, layer views and maps with the appropriate group so that inspectors can access the maps via the Collector application.
- 6. There are two hosted feature layers in the web maps that can be used to collect information separately from the assessment points:
  - a. Defect\_Point: used to identify significant defects in an item
  - b. Floor\_Plan\_Discrepancy: used to identify a discrepancy in a particular floorplan

#### 6.1.3.4 Processing Data After a Field Event

- A. Download a Copy of the Data from AGOL
  - From ArcGIS Online, open the Assessment Point\_new feature layer, press Export Data > Export to FGDB.
  - 2. URL:

https://maryland.maps.arcgis.com/home/item.html?id=89e7819eefb64b6cb833f40d83d2437f

- 3. From the GIS analyst's desktop, unzip folder and save file geodatabase to a project folder.
- B. Process the Data to Create the MDOT Deliverable
  - 1. Open a new project in ArcGIS Pro.
  - 2. Pull the feature class and all assessment tables into an empty map. The GIS analyst should label this map so they know they are working with an offline copy of data that needs to be cleaned up.
    - a. Review the assessment data collected by inspectors.
    - b. Use the *CreationDate* field to query only those inspection records created during the field work
    - c. Confirm that ratings add up to 100 and that criticality, system/subsystem/component have been filled in (CRITICALITY IS NOT NULL, SYSTEM IS NOT NULL, SUBSYSTEM IS NOT NULL, COMPONENT IS NOT NULL). If these are missing, contact inspectors for the correct information.
      - i. To see the location of assessment records with missing info, join these records to the assessment point feature class (ParentGUID  $\rightarrow$  GlobalID)
      - ii. Once the GIS analyst receives the corrected values, make changes to the Hosted Feature Layer in AGOL. (Inspectors can use the Collector app to fill in their own missing info as well)
      - iii. Redownload a copy of the corrected FGDB.
  - 3. If data looks complete and accurate, open the toolbox (MAA\_step1.atbx) and double click the Step 1 Export Summaries by System tool
    - a. Parameters should auto populate per the screenshot below
    - b. Set the download location path for each system file to a local drive
    - c. Run tool the following will appear if successfully completed

Step 1 Export Summaries by System completed.
 View Details Open History

- d. This will create Excel files for each system with average score for each asset rating and criticality broken out by component and the subsystem for each building.
- e. In Excel, open the output file for the system of interest. Use control + A to select the entire data range, and click the filter button on the data tab. At the top of each column, there is now a filter option. On the BuildingID column, select the building of interest. This will filter the data to show only the subsystem and components related to the building of interest.
- f. In another Excel window, open a copy of the MDOT Facility Assessment Form. Copy and paste the appropriate values form the export into the MDOT deliverable. Make sure to complete all fields in the MDOT deliverable per the instructions in the manual.

-)	Step 1 Export Sumaries by System	
	Step 1 Export Sumaries by System	
arameters	Environments	
GeneratorAs	sessment	
GeneratorA	ssessment •	
Conveyance	Assessment	~
Conveyance	eAssessment •	
HVACAssess	ment -	_
HVACAsses	sment ·	
InteriorsAsse	ssment	
	essment	
PlumbingAs	sessment	
SecurityAcco	rement	
SecurityAsse	essment T	-
ShellAssessm	hent	
ShellAssessi	ment -	-
Substructure	Assessment	
Substructur	eAssessment -	
Download Lo	ocation: EquipmentAssessment ExLxIs	
C:\TEST\MA	A_Data_Tools\ToolTest\Output\EquipmentAssessment_Exl.xls	6
Download Lo	ocation: FireProtection_Exl.xls	
C:\TEST\MA	A_Data_Tools\ToolTest\Output\FireProtection_Exl.xls	F
Download Lo	ocation: ElectricalAssessment_ExI.xls	
C:\TEST\MA	A_Data_Tools\ToolTest\Output\ElectricalAssessment_Exl.xls	F
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Download Lo	ocation: HVACAssessment_ExLxIs	
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Dennel	on_Data_tools\toollest\output\onellAssessment_extixis	
Download Lo	ocation: Substructure Assessment_ExI.xis	~

g. Repeat this process for every system output Excel file.

ATTACHMENT 2

Volume 1, Appendix 1H Asset Management Appendix

## **1H.1** Asset Management Appendix

## Facility Assessment Inspector Checklist (.docx, 1 page)

Click the image to download the document in Microsoft Word format.

Fac	ility /	Assessment: Inspector Checklist					
Inspec the fie	Inspectors should use this checklist to ensure they are prepared for performing facility assessments in the field using the MDOT Facility Assessment Protocol.						
Wee	ek Be	fore the Field Event					
	Has th	e inspector read the Facility Assessment Manual?					
		Does the inspector understand the condition rating scores and the DINIR form?					
		Does the inspector understand the criticality ratings?					
	Has th	e inspector read the Facility Assessment: Collector Application Guide?					
	ls the i	inspector familiar with the Assessment Level Matrix?					
		Does the inspector know at what level of granularity (building, room, or asset) each component or subsystem will be assessed?					
	Does t	he inspector have an ArcGIS Online account?					
	Has th	e inspector attended a training session?					
		Has the inspector downloaded the Collector Application onto their tablet?					
	Has the inspector tested the following?						
		Opening the Facility Assessment Map					
		Turning layers on/off and using bookmarks					
		While online, creating an assessment point, creating a related assessment record, and taking a photo					
		Taking a map offline, creating an assessment point, creating a related assessment record, taking a photo, and syncing back to the cloud					
Day	of Fi	ield Event					
	Confin	m the inspector has a fully charged tablet with a charger					
	Confin	m the inspector has a hotspot and hotspot charger					
	lf work The in:	xing offline, confirm all areas needed for the day's assessments have been downloaded. spector must connect to the internet to download a map onto their device.					
	Confin table, 1	m the inspector has a paper copy of the MDOT Facility Assessment Manual and Excel the Collector Application Guide, and the Assessment Level Matrix for reference.					
	Confin techni	m the inspector has contact information for the GIS analyst providing the inspectors with cal support in case there are issues in the field.					
	lf work again a	king offline, inspectors must data periodically. At minimum, sync the data at lunchtime at the end of the day.					

## Facility Condition Assessment Manual (.pdf, 110 pages)

Click the image to download the document in PDF format.





## **Facility Condition Assessment Manual**



August 30, 2019



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## 1 About the Guidebook

#### 1.1 Overview of Facility Condition Assessments

#### 1.1.1 Background

The Moving Ahead for Progress in the 21st Century Act (MAP–21) and Fixing America's Surface Transportation (FAST) Act established new asset management requirements for transit and highway agencies. In recognition of these requirements affecting several TBUs within MDOT, TSO has established the requirement to institute and maintain an Asset Management protocol for six primary asset categories common across the TBUs. The categories are: facilities; structures; pavement; vehicles; equipment; and IT systems. The document provides the guidance to assess and report the condition of the facility assets utilizing the following rating scale, in which the condition is described as 5.0-Excellent, 4.0-Good, 3.0-Adequate, 2.0-Marginal, or 1.0-Poor.

A facility is defined as a single building. A campus may be comprised of multiple facilities (buildings) to be separately assessed.

#### 1.1.2 Purpose of the Condition Assessments

The condition assessment describes the overall physical condition of each facility. The data are used to support capital investment decisions. Condition assessors also note and report any defects, conditions, or circumstances that may constitute a safety concern as they may require immediate attention.

The condition assessments enable the MDOT TBU to monitor facilities' condition and identify deficiencies; reviewing the individual assessment forms provides indicators about where MDOT should focus, per facility, in prioritizing repairs and improvements and planning for the funding of those improvements.

#### 1.2 Navigating this Document

The Guidebook describes how a facility condition assessment is to be performed, including an overview of the purpose and structure of a facility condition assessment in this chapter, and continuing with roles and responsibilities of the condition assessment team in chapter 2 and the process of conducting the assessment in chapter 3. Chapter 4 provides guidance for the assessment of each component and element of a facility.

Appendices include the Field Condition Assessment Form to be completed for each facility (Appendix A), and the Facility Condition Rating Guide (Appendix G) to be used in the field by the assessment team to evaluate and assign condition ratings to each building subsystem (see section 1.3). Appendix B is a (Critically) Damaged or In Need of Immediate Repair (DINIR) form, to be completed for each finding of such a building component during an assessment. Also included in the Appendix are quality control checklists to be employed by the assessment team and a quality assurance checklist for use by the



MDOT TBU Asset Management team and the facility administrators.

#### 1.3 Logic of a Facility Assessment

This document outlines the method by which facilities, including their associated systems, subsystems and components, are assessed as to their condition. Guidance on facility condition assessments defines the primary building systems and subsystems to be assessed in calculating the overall facility condition. Components are the most granular level of the condition assessment.

For each facility, the condition assessment team in the field rates the condition of each building subsystem by performing a visual assessment of the components that make up that subsystem. For instance (as shown in Table 1), the facility's Substructure system is comprised of the Foundation and the Basement subsystems. The components of the Foundation subsystem include the walls, columns, and pilings; the components of the Basement include materials, insulation, slab, and floor underpinnings.

Table 1. Example Hierarchy

Facility (Level 1)	System (Level 2)	Subsystem (Level 3)	Components (Level 4)
Substructure		Foundation	Walls, columns, pilings,
		Basement	Materials, insulation, slab,
			floor underpinnings

To arrive at the condition of the Foundation, the condition assessment team will visually assess the walls, columns, pilings, and slab. The condition assessment team will record the percentage of each component receiving a particular rating. For instance, 10% of the Columns might be rated a 4, 60% a 3, and 30% a 2.

						Percent of Asset Quantity by Condition							
C	Cubauatana	Component	Accet	Cuiticality	Enter N/A if	5	4	3	2	1	C		
System	Subsystem	Component	Asset	Asset	Asset	Criticality	not present	Excellent	Goood	Adequate	Marginal	Poor	Score
Substructure			$\searrow$	1									
				$\langle - \rangle$							1.7		
	Foundation		*	$\sim$									
				arsigma		37.78	2.13	2.75	2.60	2.00	2.1		
		Walls		2		100					$\times$		
						100					$\langle - \rangle$		
		Columns		3			10	60	30		$\times$		
		Piles		2							$\bigtriangledown$		
				-		50	50				$\leq $		
		Slab		2		20	20	20	20	20	$\times$		

The condition assessment team should then establish the criticality of each component defined as follows:

Criticality					
Score	Definition				
3	Critcal- Failure would have significant adverse impacts				
2	Major- Failure would have moderate adverse impacts				
1	Minor - Failure would have minimal impacts				

Using the criticality value and the assigned condition for each component, the weighted value of each condition state is calculated for the Foundation. A weighted average rating for the



Foundation subsystem is calculated, rounded one decimal point; in the above case for example, the Foundation is rated 2.1.

The condition rating for a system is computed as the average for the subsystem ratings rounded down to the nearest tenth of a point.

						Percent of Asset Quantity by Condition													
Sustam	Subsystem	Component	Asset Cri	Asset	Asset	Asset	Asset Criticality	Accet	Accet	Annat	Accet Critical	Accent Columnities Ent	Enter N/A if	5	4	3	2	1	Seere
System	Subsystem	component						ASSet Criticality not prese	not present	Excellent	Goood	Adequate	Marginal	Poor	Score				
Substructure			$\sim$																
Jubben declare				arsigma							1.7								
	Foundation		*	$\searrow$															
				arsigma		37.78	2.13	2.75	2.60	2.00	2.1								
	Basement			$\searrow$															
				$\sim$		1.67	30.00	1.67	0.00	0.00	1.3								

The system condition ratings are then submitted to the MDOT Asset Management team, which will use its dashboard tool to weight system ratings by safety criticality in calculating the overall facility condition rating.

#### 1.4 Definition of Condition States

The following descriptions should be utilized by the Condition Assessment Team to determine the appropriate condition state and rating for each subsystem or component that is evaluated during a facility assessment.

Condition	Ratings	Description
Excellent	5.0 to 4.8	New subsystem/component; no visible defects
Good	4.7 to 4.0	Subsystem/component showing minimal signs of wear; some (slightly) defective or deteriorated component(s)
Adequate	3.9 to 3.0	Subsystem/component has reached its mid-life (condition 3.5); some moderately defective or deteriorated component(s)
Marginal	2.9 to 2.0	Subsystem/component reaching or just past the end of its useful life; increasing number of defective or deteriorated component(s) and increasing maintenance needs
Poor	1.9 to 1.0	Subsystem/component is past its useful life and is in need of immediate repair or replacement; may have critically damaged component(s)



## 2 Roles and Responsibilities of the Condition Assessment Team

#### 2.1 Individuals

#### 2.1.1 Project Manager

The Project Manager is responsible for the overall condition assessment project. The Project Manager:

- Communicates with the contracting entity (MDOT or TBU administrator)
- Communicates with the other members of the condition assessment team
- Establishes and maintains schedule
- Issues invoices
- Prepares contract modifications if needed
- Leads Quality Control and Quality Assurance efforts

#### 2.1.2 Assessment Leader

The Assessment Leader acts as the Project Manager's deputy. The Assessment Leader:

- Communicates with Project Manager and other team members
- Communicates with facility contacts
- Initiates and follows up on facility information gathering
  - Originates e-mail to facility contact describing the assessment and procedures
  - Schedules assessments (per Project Manager's established schedule)
  - Confirms assessments
- Provides Quality Control of field data for accuracy and completeness, data input and results
- Trains assessors

#### 2.1.3 Assessor

Assessors work with the Project Manager and the Assessment Leader. Assessors:

- Walk facility to assess conditions
- Request copies of certificates of inspection for elevators and boilers when not visible during the assessment
- Provide Quality Control of field data for accuracy and completeness
- Perform other duties as assigned

#### 2.2 Training

Training shall be provided for the condition assessment team and may be conducted by previous assessors or individuals with sufficient experience evaluating building conditions. Training should be performed in pairs for ratings calibration/norming, preferably by walking through the procedure at a test site. This training may be unnecessary for individuals who have three years of general building assessment experience or an engineering degree and a good working knowledge of building components. However, walkthroughs and score norming are considered best practices (and should be considered required for members of the assessment team without building assessment or engineering qualifications).



#### 2.3 Team Communications

Communications among the assessment team should occur as frequently as is necessary to ensure smooth assessment logistics and accurate and complete data collection and submission.

The Project Manager will communicate with the contracting entity regarding budgetary, staffing, and contractual issues, and with each TBU representative. Assessment Leaders communicate to assessment team members the schedule of assessments, and collate feedback from the team, including refinements in the recording, and idiosyncrasies of individual sites. Condition assessment team members are encouraged to communicate with one another for the purposes of norming ratings and exchanging assessment best practices.

#### 2.4 Safety and Dress Code

Facility condition assessments should not be dangerous endeavors, but there are some modest risks to assessing facilities. Condition assessment team members should never engage in any activities that place them in undue risk of harm.

Two potentially dangerous assessment activities involve climbing ladders and the assessment of roofs. Condition assessment team members are only expected to climb ladders to roofs or other elements that are less than 24 feet tall and are affixed with an OSHA-approved safety cage. These ladders are described in the "Cages for Fixed Ladders" section of the OSHA Stairways and Ladders: A Guide to OSHA Rules.<sup>1</sup>

While condition assessment team members are empowered to use their own judgment, they are not expected to access roofs that are pitched. In instances where a roof is not assessed visually, the condition assessment team may apply ratings based on the roof's age versus its life expectancy. Chapter 3 contains the business rules for assigning a condition score to an unobserved roof.

Considering the nature of assessment site visits, the dress code for the condition assessment team is defined, generally, as khaki slacks or dark jeans (no shorts); collared shirt, blouse, or sweater; and comfortable hard-soled working shoes. (Note that assessors will climb ladders, walk the site, and will otherwise be on their feet for several hours each visit.) Tennis shoes, clogs, thongs, and sandals are prohibited.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> Occupational Safety and Health Administration. *OSHA Stairways and Ladders: A Guide to OSHA Rules*. Washington, DC: OSHA Publications Office, 2003.



## 3 Process Overview

#### 3.1 Frequency

MDOT requires that TBUs conduct assessments of all facilities every five years. This can be achieved by assessing all facilities in one year, assessing a rotating quarter of facilities each year, or some other scheme.

#### 3.2 Materials Acquisition

The condition assessment team must collect and bring to the location of each facility condition assessment:

- One copy of the Field Condition Assessment Form *per facility* to be assessed (Appendix A)
- Several copies of the (Critically) Damaged or In Need of Immediate Repair (DINIR) Form (Appendix B)
- One copy of the Facility Condition Rating Guide (Appendix G)
- One copy of the Facility Component Assessment Field Procedure (Chapter 4 of this Guidebook)

The condition assessment team must also collect and review a copy of each facility's MDOT TBU Asset Management Form 6a, and identify (e.g., highlight) equipment on the list that is considered safetycritical. Equipment that is considered safety-critical includes:

- CNG Refueling Station
- Fuel Island
- Fuel Tank
- Lift (Portable)
- Safety/Security Fire and Emergency Management System

The team must also acquire a list of the facility managers. In some instances, the points of contact may vary by building (facility) within a single location.

#### 3.3 Communications Plan

The condition assessment team should draft a schedule for the duration of the assessment season and reach out to facility managers to confirm these dates. The communication, initiated by the Project Manager, should include a brief survey to which the facility manager will be asked to respond.

#### 3.3.1 Scheduling Email

Subject: [Location Name] Facility Condition Assessment

#### Good morning [Name],

Per MDOT practice, all facilities owned or co-owned/leased by MDOT TBUs must undergo a Facility Condition Assessment every four years. I am reaching out to schedule a date to assess the condition of the buildings at [Location Name]. I have tentatively scheduled that assessment for [Date] and plan to arrive at [Time]. **Does this date and time work for you?** 



Ahead of my arrival, I would like to get a sense of the facilities' general conditions and about some potentially difficult-to-access areas. **Please reply to the below questions in your return email.** 

- 1. Are there any unique aspects of any buildings that you would like to share with me ahead of time? What should I know before I arrive?
- 2. How are the roof(s) of the building(s) at your location accessed? (Please answer for each building.)
- 3. Is the HVAC system accessible?
- 4. Are there any buildings at your location for which you do not have any direct capital responsibility (complete or shared)? Which one(s)?

If you have any questions about the assessment, please reach out to the MDOT Asset Management team.

I look forward to hearing from you soon, and to meeting you on [Date]! Thank you!

Best,

[Name]

#### 3.3.2 Reminder Email – 3 Days Before Visit

Subject: [Facility Name] Facility Condition Assessment – [Date of Assessment]

Good morning [Name],

I am writing to confirm our appointment on [Date] at [Time] for the condition assessment of the facilities at [Location Name]. I am looking forward to meeting you and getting to know your facility.

While we are there, I would also appreciate your help in reviewing the most recent copies of any third-party inspection certificates (e.g., for elevators or boilers) that may be relevant to your facility.

Best,

[Name]

#### 3.3.3 Thank You Email

Subject: [Location Name] Facility Condition Assessment on [Date]

Good morning,

I am writing to say thank you for taking the time to assist me in conducting a condition assessment of the facilities at [Location Name].



If you receive the [elevator, sprinkler, etc.] system certificate that we discussed within the next [Time Period], please forward to me a copy of that certificate and I will be happy to update the ratings reported to the MDOT Asset Management team.

Best,

[Name]

#### 3.4 On-Location

#### 3.4.1 Upon Arrival

Having gathered materials and sent scheduling and reminder emails to facility managers, the condition assessment team is now ready to arrive at the location to conduct facility assessments. Upon arrival and meeting the facility manager, ask the facility manager:

- a. if there are any issues to discuss ("What should we know about the facilities here?"); and
- b. where the sprinkler supply pipe to upper floors is located.

The assessment team should discuss the performance of any building components to which the assessment team should pay special attention (e.g., chillers and heat rejection equipment, fans), as well as the age of systems or components that cannot be viewed (e.g., inaccessible roofs). The assessment team should request required third-party inspection certificates (e.g., for elevators) when they are not observed.

If, upon arriving at the location, there appear to be more facilities to be assessed than were expected, the condition assessment team will need to determine if there is sufficient time to complete the assessment of all facilities or if the assessment of one or more must be postponed until a later date. That discovery should be discussed with the facility manager, and his/her input should be solicited as to which facility(ies) should be assessed at that time and which should be deferred until a later date.

Any unanticipated facilities shall be reported by the assessment team to the MDOT Asset Management team so that that office may update its facilities inventory.

#### 3.4.2 Conducting the Condition Assessment

The condition assessment team conducts the complete assessment armed with all pertinent documentation: the Field Condition Assessment Form, several copies of the (Critically) Damaged or In Need of Immediate Repair Form, the Facility Condition Rating Guide, the Facility Component Assessment Field Procedure, and a copy of the location's Asset Management Form 6a.

There is no prescribed order for which the condition assessment team should observe each component: a facility's design, an assessor's preference or familiarity with the procedure, and the availability of facility personnel needed to make accessible portions of the facility may help to dictate the order in which components are assessed.

No special equipment is required for this visual assessment. However, it will be advantageous in some cases to listen for abnormalities (e.g., plumbing appliances, sanitary waste pumps, rainwater drainage sumps, heating pumps, air handling units [AHUs], variable air volume units [VAVs], chimney/vent fans) or touch (e.g., asphalt roof shingles, the edge of overhead doors) to assess the condition.



The assessment team may request facility managers or staff to open panel doors for the visual assessment of some elements (e.g., electrical panels/cabinets).

#### 3.4.2.1 Defects, Conditions, or Circumstances that May Constitute a Safety Concern

The DINIR Form shall be completed when the assessment team discovers any defect, condition, or circumstance that may present a safety concern. For defective subsystems or components or those in poor condition, the assessment team also shall mark the according percentage of the subsystem with a 1 rating category on the Field Condition Assessment Form. For all such defects, conditions or circumstances, note the discovery in the Concerns and Improvements space at the bottom of the Field Condition Assessment Form with the facility manager upon completion. Note that facility condition assessments are not formal safety inspections, but the condition assessment team shall alert the facility manager to such a discovery.

The team will also assess safety-critical equipment (as discussed in Section 3.2). Any discoveries of poor condition of those pieces of equipment shall be recorded on a DINIR Form, noted in the Concerns and Improvements space at the bottom of the Field Condition Assessment Form, and verbally communicated to the facility's manager. The condition of safety-critical equipment **will not** be incorporated into the scoring of the facility.

#### 3.4.2.2 Best Practices and Business Rules

Below is a list of several best practices and general business rules.

- 1. If there is no basement, conduct a visual assessment of the foundation from the outside.
- 2. Make notes on the Facility Condition Assessment Form. For example, when making observations in an unconventional way, such as of the foundation from the outside of the building instead of from within the basement, note that the foundation was assessed from the exterior.
- 3. If an element is under repair, assign it a rating as if the repair were completed.
- 4. When evaluating subsystem elements that require third-party inspection certificates (e.g., elevators):
  - a. If the certificate is current, assess the system visually per established guidance.
  - b. If the certificate is lapsed:
    - i. assess the subsystem visually per established guidance;
    - ii. report the element's score as a 1;
    - iii. fill out (Critically) Damaged or In Need of Immediate Repair (DINIR) Form;
    - iv. adjust reported score (change from 1 to visually-assessed rating) IF the condition assessment team receives proof of the certificate *prior to* reporting the score itself.
- 5. When assessing an opposite-sex bathroom:
  - a. knock and announce intention to enter for facility assessment;
  - b. wait 3-5 seconds for a verbal reply;
  - c. enter and prop the door open;
  - d. display sign reading "Facility Assessment Underway. If you need to use the bathroom immediately, please tell me and I will exit."
- 6. When scoring an unobserved roof, assign it the score that relates its age to the quintile of its life expectancy.



a. For instance, consider a 7-year old roof with a life expectancy of 25 years. Ages 6-10 are in the second quintile from brand new, so the roof should receive a score of 4.

System	Life Expectancy (years)
Asphalt Shingles	20
Built-Up	20
Membrane	20
Metal	30

#### 3.4.3 Upon Completing the Visual Assessment

After completing the assessment, the assessment team should debrief with the facility manager. During this conversation, the team shall notify the facility manager of any 1-ratings, completed DINIR Forms, or comments written in the Concerns and Improvements space. The facility manager may make copies of these forms, but the original forms shall be retained and then scanned and sent to the MDOT Asset Management team (see next paragraph).

Upon returning to the assessment team's home base:

- Scan and send original DINIR forms and a log listing all DINIR forms being submitted to the MDOT Asset Management team
- Deliver the facility system condition ratings to the MDOT Asset Management team for calculation of the overall facility scores
- 3.5 Data Quality Control and Assurance

#### 3.5.1 Quality Control and Quality Assurance

Quality Control (QC) refers to the act of taking measurements, testing, and inspecting a process or product to assure that it meets specification. The Pre-Assessment Checklist (Appendix C) assists the condition assessment team in verifying that it has all materials required for the successful completion of the facility assessment. The Post-Assessment Checklist (Appendix D) assists the condition assessment team's verification that it has completed all steps of a facility condition assessment. Complete this checklist while still on-site. The Delivery Checklist (Appendix E) assists the condition assessment team in his/her efforts to accurately package and submit all facility assessment materials.

Quality Assurance emphasizes actions at a management level that directly improve the chances that Quality Control actions will result in a product or service that meets requirements. The Quality Assurance Checklist (Appendix F) contains several steps that the MDOT Asset Management team and the local facility administrators complete to ensure the successful execution of each facility condition assessment.

#### 3.5.2 Document Control

Ensure that all facility assessment documents, including all Checklists, are maintained and available for issuance to the MDOT Asset Management team upon request.



## 4 Facility Component Assessment Field Procedure

#### 4.1 About ThisSection

This section provides general guidance for the assessment of each component of a facility. Considering each of the bullet points will result in the most successful determination of the system and subsystem condition ratings, and in turn the calculation by MDOT of the overall facility condition rating.

While most facilities will have ratings for each subsystem, it is possible that some may not. For instance, a one-story administrative or maintenance facility may lack both a qualifying conveyance and basement.

When conducting visual assessments of safety-critical equipment, ensure that all features referred to on any posted placards are present, and incorporate any absence in the Concerns and Improvements space. Consider also the readability of any such posted placards.

#### 4.2 Substructure

#### 4.2.1 Foundations

- Assess the condition of the foundations, walls, columns, pilings, and other structural elements.
- Look for out of plumb, gaps, spalls, delamination, cracks, missing or cracked mortar, missing or cracked bricks, moisture, stains, organic growth, rust and damage.

#### 4.2.2 Basement

- Assess the non-foundation and structural elements such as facing materials, insulation, slab, floor underpinnings, crawl spaces, etc.
- Look for out of plumb, out of level, gaps, spalls, delamination, cracks, missing or cracked mortar, missing or cracked bricks, moisture, stains, organic growth, rust, failing finishes and damage.

#### 4.3 Shell

#### 4.3.1 Superstructure / Structural Frame

- Assess elements including columns, pillars, and walls.
- Look for out of plumb, out of level, gaps, spalls, delamination, cracks, missing or cracked mortar, missing or cracked bricks, moisture, stains, organic growth, rust and damage.

#### 4.3.2 Roof

• Assess roof surface (tiles, membrane, shingles, gravel etc.), gutters, eaves, skylights, flashing, chimney surrounds, and sealants, hardware and painted or coated surfaces.

#### 4.3.2.1 Asphalt Shingles

- Examine the roof shingle material for any deterioration which would allow water to penetrate through the roof into the building.
- Look for blisters, cracks, buckled, curled, damaged and missing shingles.
- If easily accessible, feel for spongy and soft conditions. Look for stains viewed from below. Check flashing and valleys for deterioration.
- Examine any expansion joints in the roof, if present, for debris accumulation and deterioration of the joint material.
- Examine penetrations and details such as pipes, hatches, vents, skylights, stacks and supports for deterioration.



#### 4.3.2.2 Build-Up and Membrane (Ethylene Propylene diene Monomer (EPDM), Polyvinyl Chloride (PVC), Thermoplastic Polyolefin (TPO) and Modified Bitumen)

- Examine the roof coating material for any deterioration which would allow water to penetrate through the roof into the building.
- Look for blisters, cracks, wrinkles, damage and evidence of ponding.
- Check the barriers such as flashing, base flashing, counter flashing and gravel stop around the perimeter of the roof for deterioration.
- Examine drains in the roof and the overflow scuppers for damage and debris.
- Examine any expansion joints in the roof, if present, for debris accumulation and deterioration of the joint material.
- Check penetrations and details such as pipes, hatches, vents, skylights, stacks, pitch pockets, equipment curbs and supports for deterioration.

#### 4.3.2.3 Metal

- Assess the roof panels for any deterioration which would allow water to penetrate through the roof into the building.
- Look for corrosion, damage, broken joints and deteriorating finish.
- Examine the intersections such as flashing, base flashing, counter flashing, ridge cap and valleys around the roof for deterioration.
- Examine any expansion joints in the roof, if present, for debris accumulation and deterioration of the joint material.
- Check penetrations and details such as pipes, hatches, vents, skylights, stacks, pitch pockets, equipment curbs and supports for deterioration.

#### 4.3.3 Exterior

- Assess windows, doors, and all finishes (paint, masonry).
- Assess the condition of the window sashes. Look for out of square, gaps, opening and closing issues, hardware, weather stripping, damage, rust and paint issues. Examine the glazing for condensation, scratches, fogging, seal failure and broken panes. Check frames for looseness, damage, gaps, lintels, rust and paint issues.
- Assess the condition of the doors. Look for out-of-square, gaps, opening and closing issues, weather stripping, damage, rust and paint issues. Examine the glazing for condensation, scratches, fogging and broken panes. Check frames for looseness, damage, gaps, threshold issues, transom or sidelight damage, lintels, rust and paint issues.
- Assess the condition and function of the hardware looking at hinges, closers, locksets, panic bars and ADA controls.
- Examine storefronts for deterioration, deflections, leaks, adhesives & sealant failures, flashing and that it is draining properly.
- Assess the condition overhead doors. Examine curtain slats and curtain jab guides for corrosion, deformations, damage and wear. Inspect accessories such as weather-stripping, smoke-seals for fire-rated doors, slide bolts, chain lock keepers and push/pull handles function properly.
- If in operation, visually and audibly check for any abnormal sounds or movement in the doors and motors.
- Observe that the overhead door seals to the ground when closed.


- Check for any open electrical boxes related to the overhead doors. Check disconnects for out of service tags. Examine conduits for corrosion and failures.
- Check finishes for cracks, peeling paint, missing or cracked mortar, missing or cracked bricks, damage, moisture, stains, organic growth, surface damage, failing joints and rust.

## 4.3.4 Shell Appurtenances

- Assess façade, curtain wall system, glazing system, exterior sealants, exterior balconies, fire escapes, gutters, downspouts.
- Look for out of plumb, damage, gaps and cracks.
- Look for failed seals, clogged drain holes, rust and paint issues in the curtain wall system. Look for condensation, scratches, fogging and broken panes in glazing. Examine sealants forfailures.
- Assess attachments and conditions for all appurtenances such as balconies and fire escapes.
- Observe whether the gutters and downspouts are functioning properly and are not clogged with debris.

## 4.4 Interiors

### 4.4.1 Partitions

- Assess walls, interior doors, fittings, ceiling tiles and signage for overall condition.
- Examine ceilings for evidence of leaks, damage, cracks, missing and bowed tiles.
- Check walls for leaks, damage, cracks, leaning & bulges and settlement.
- Examine interior doors and frames for out of square, gaps, thresholds, wear, hardware, finishes and operating issues. Check interior glazing for broken panes, scratches, fogging and damage.
- Assess condition of signage.

#### 4.4.2 Stairs

• Assess interior stairs and landings including fire and access issues. Look for damage and deterioration to treads, risers, rails and landings.

#### 4.4.3 Finishes

• Assess materials used on walls, floors, and ceilings, such as tile, paint, and other coating. Assess wear, damage, cracks, chips, peeling paint, movement, rips stains and worn edges.

## 4.5 Conveyance

#### 4.5.1 Elevators

- Assess condition, function, and annual certificate of inspection.
- Assess for overall condition, unusual noises, call buttons, door automatic reopen when obstructed function, in car controls, hallway lanterns, audible signals and jambsignage.

#### 4.5.2 Escalators

- Assess condition, function, and annual certificate of inspection.
- Assess for overall condition, unusual noise/vibrations, comb teeth, landing plate, steps, that handrail is move at same speed as steps, wedge guards, and stop buttons.



# 4.5.3 Lifts

- Assess any other fixed apparatuses for the movement of goods, vehicles, or people for condition, function, and annual certificate of inspection.
- Assess for overall condition, unusual noises, call buttons, doors, door automatic reopen when obstructed function, in car controls, hallway lanterns, audible signals, and jamb signage.

## 4.6 Plumbing

## 4.6.1 Fixtures

- Assess lavatories, toilets, urinals, other sinks, drinking fountains and faucets.
- Examine urinals, water closets and piping for cracks, damage or leaks. Check a sample to ensure they flush and drain properly. Examine that they are caulked and sealed to adjacent surface.
- Examine lavatories, showers and other sinks for crack, damage, deterioration or leaks.
- Check a sample of faucets and diverts for flow, drainage and proper temperature. Observe whether they are caulked and sealed to adjacent surface.
- Examine appliances (dishwashers, clothes washer, disposal, ice makers, etc.) for damage, deterioration, leaks and that they are functioning properly. Check supply and drain line for leaks. During operation, visually and audibly check for any abnormal sounds or vibrations.

### 4.6.2 Water Distribution

- Examine piping for corrosion, distortions and deterioration.
- Assess supports both at the anchorage and clevis/clamp ends.
- Examine insulation for deterioration and damage.
- Look for leaks or evidence of leaks. Assess pipe labeling and hardware such as shut offs. Where possible check for flow and blockages.
- Examine water heater and piping for damage, corrosion, deterioration or leaks. Assess valves, insulation and whether a pressure relief valve is present.

## 4.6.3 Sanitary Waste

- Examine piping for corrosion, distortions and deterioration.
- Assess supports both at the anchorage and clevis/clamp ends.
- Look for leaks or evidence of leaks. Where possible check for flow and blockages.
- Examine ejector pumps for damage, deterioration or leaks. During operation, visually and audibly check for any abnormal sounds or vibrations in the pumps. Assess piping, vent piping and check valves for damage, deterioration or leaks.

#### 4.6.4 Rain Water Drainage

- Examine piping for corrosion, distortions and deterioration.
- Assess supports both at the anchorage and clevis/clamp ends. Look for leaks or evidence of leaks. Where possible check for flow and blockages.
- Examine sumps for damage, deterioration or leaks. During operation, visually and audibly check for any abnormal sounds or vibrations in the pumps. Assess piping and check valves for damage, deterioration or leaks. Assess discharge points.



# 4.7 HVAC

## 4.7.1 Energy Supply

- Assess the structural integrity of the conduit mounting, disconnect and their supports. Look for physical damage, corrosion, missing covers and exposed wiring.
- Check enclosure for missing knockouts, and check that it seals properly.
- Look for any defective equipment that is indicated by testing tags.
- Look for proper labeling.
- Examine gas and fuel oil piping for leaks, corrosion and structural integrity of their supports.

### 4.7.2 Heating / Cooling Generation and Distribution Systems

- Examine boilers to ensure they are operating properly. Verify annual certificate of inspection for boiler.
- Ask the Facility Manager if the chillers and heat rejection equipment are operating properly.
- Examine pipes and components for corrosion and the condition of the insulation.
- Check chiller site glass for refrigerant charge and controller for errors codes, if possible. Listen for abnormal sounds.
- Check cooling towers for leaks, cooling tower pumps and motors for abnormal sounds and vibrations, and tower for scale and corrosion.
- Examine condenser coils for dirt and corrosion, fans and motors for abnormal sounds and vibrations.
- Check pipes and components for corrosion and the condition of the insulation.
- Verify that all pumps are functioning properly. During operation, visually and audibly check for any abnormal sounds or movement in the pumps and motors. Check the pumps and pipe components, both fuel and water, for leaks or evidence of leaks. Examine for corrosion and suction loss in the pumps, pump components, pump supports, pipes and pipe supports.
- Examine the pump motors, shafts and bearing for lubrication leaks. Check seals for bulges or failures. If grease is present, investigate the cause, which could be over lubrication or seal failures.
- Assess the condition and functionality of all gages.
- Verify that the air handling units (AHU) are functioning properly. Examine AHU housing and doors for corrosion, leaks and deterioration. Check fans for damage. Look over coils for leaks, dirt and damage. Assess condensate drains. Check filters for dirt and that they are installed properly.
- During operation, visually and audibly check for any abnormal sounds or movement in the motors, belts, fans and freeze pumps. Examine the motors, shafts and bearing for lubrication leaks. Check if seals are bulging or have failed. If grease is present, investigate the cause, which could be over lubrication or seal failures. Assess the condition and functionality of all gages. Examine piping for leaks and insulation.
- Examine outdoor air supply and exhaust ducts for leaks. Check that louvers and grills are in place. Check the duct work for corrosion and deterioration. Check supports for loose connections both to the building and to the duct. Assess insulation. Examine system for leaks. View inside of ducts where possible to look for dirt.



- Ask the Facility Manager if the DX (direct expansion) air condition systems are operating
  properly. Examine pipes and components for corrosion and the condition of the insulation.
  Check indoor air handling unit cabinet for corrosion and damage. Examine evaporator coil for
  damage dirt and blockage. Examine condensate pump and condensation line for signs of leaks or
  overflows. Check fans and motors for abnormal sounds and vibrations.
- Assess refrigerant lines for supports, insulation and leaks.
- Examine outdoor air condensing unit cabinet for corrosion and damage. Examine condensing coil for damage dirt and blockage. Check fans and motors for abnormal sounds, vibrations and damage. Check refrigerant lines for supports, insulation and leaks.
- Verify that VAVs (variable air volume systems) are functioning properly. Examine VAV housing, panels and supports for corrosion, leaks and deterioration. Check fans (if applicable) for damage. During operation, visually and audibly check for any abnormal sounds or movement. Examine coils (if applicable) for leaks, dirt and damage. Assess the condition and functionality of gages. Examine piping and valves for leaks and insulation. Check connection to duct work for leaks.

# 4.7.3 Testing, Balancing, Controls, and Instrumentation

- Assess valves, dampers, sensors and instruments.
- Verify that the building management control system is functioning properly by surveying people and data.
- Verify programing for proper set points and hours of operations.
- Assess compressors and control lines (if non-direct digital system) operations, leaks, disconnections and damage.
- Assess devices such as thermostats, sensors, dampers, valves and other components, for proper functionality.

## 4.7.4 Chimneys and Vents

- Assess exhaust fans, ductwork, flues, cleanouts and caps.
- Examine exhaust fan housing for corrosion, leaks and deterioration.
- Examine fans for blade damage. Ask the Facility Manager if all fans are functioning properly. If in operation, visually and audibly check for any abnormal sounds or movement in the fans and motors. Examine the fan motors, shafts and bearing for lubrication leaks. Check if seals are bulging or have failed. If grease is present, investigate the cause, which could be over lubrication or seal failures.
- Examine the duct work for corrosion and deterioration. Check supports for loose connections both to the building and to the duct, corrosion and deterioration. Assess dampers to ensure they are functioning properly. Assess insulation. Examine system for leaks. Observe whether grills and diffusors are present. View inside of ducts where possible to look for dirt. Look for bird nest or debris buildup on the cap.
- Assess whether chimney is plumb and mortar and brick are in good condition. Examine chimneys and flues for evidence of leaks such as soot.



# 4.8 Fire Protection

#### 4.8.1 Sprinklers

- Examine heads for corrosion, damage and observe if they are free of foreign material such as lint and paint.
- Examine piping for corrosion, leaks or damage. Check piping supports both at the anchorage and clevis/clamp ends.
- Assess flow and taper switches for general overall condition.

### 4.8.2 Standpipes

• Examine standpipes piping and hose connections for corrosion, leaks or damage. Check that all caps are in place and in good condition.

### 4.8.3 Hydrants and Other Fire Protection Specialties

• Assess fire alarms, smoke evacuation, stairwell pressurization and other related elements for overall condition and that they are in working order.

### 4.9 Electrical

### 4.9.1 Electrical Service & Distribution

- Assess cable, wires, cabinets, breakers, panel boards and grounding. Look for any damage to the service entrance cable, supports, insulation, cabinets and risers.
- Assess whether the service entrance is properly protected.
- Assess switchgear room for light and ventilation. Look for any defective equipment that is indicated by testing tags.
- Observe the indicator and pilot lights to verify that they are functioning properly.
- Look for any panel covers that are missing or have been removed, that they close tightly, are not missing hardware and there are no open areas where a breaker or breaker filler plate should be. Examine the panel boards to see if any breakers have been tripped. Check panel boards for proper labeling on the face of cabinet for panel name and in the interior for the circuit labeling. Assess panel condition and cleanliness.
- Assess cabinet condition and cleanliness.
- Look for any damage and corrosion to supports, panels and conduits.
- Look for any defective equipment that is indicated by testing tags.

#### 4.9.2 Lighting & Branch Wiring (interior and exterior)

- Assess wiring and devices.
- Assess the structural integrity of the light fixtures, supports, anchorages, boxes and conduits. Check for missing or inoperable lights and that the controls are working properly. Look for cracked, hazed or missing lens.
- Examine conduits and boxes for exposed wiring, missing covers and corrosion. Look for any damage and corrosion to boxes, conduits, supports and outlets.
- Assess structural integrity of anchorages for all components.
- Examine conduits and boxes for exposed wiring, missing covers and missing knockouts.



- Check face of receptacle sockets for chips, cracks or damage. Assess tension of receptacle contacts by pulling out plugs. Determine whether ground fault interrupter (GFI) outlets are installed in wet locations.
- Assess the structural integrity of the light fixtures, exit lights, emergency lights, supports, anchorages, boxes and conduits. Check for missing or inoperable lights and that the switches and controls are working properly. Look for cracked, hazed or missing lens.
- Examine conduits and boxes for exposed wiring, missing covers and corrosion.

# 4.9.3 Other Electrical System-Related Elements

- Assess overall condition of such elements as lightning protection, generators, and emergency lighting.
- Assess the structural integrity of the supports, anchorages, boxes and conduits. Examine conduits and boxes for damage, exposed wiring, missing covers and corrosion.
- Examine generators for leaks and damage.

# 4.10 Security

# 4.10.1 Cameras and Controls

- Assess overall condition of cameras and security control devices.
- Assess the structural integrity of the supports, anchorages, boxes and conduits. Examine conduits and boxes for damage, exposed wiring, missing covers and corrosion.
- Assess overall functionality of security system.

## 4.10.2 Sensors and Annunciators

- Assess overall condition of such elements as window and door sensors, emergency push bar alarms, sirens, horns, strobes and other audible and visible annunciator devices.
- Assess the structural integrity of the supports, anchorages, boxes and conduits. Examine conduits and boxes for damage, exposed wiring, missing covers and corrosion.

# 4.11 Site – NOT CURRENTLY REQUIRED

## 4.11.1 Pedestrian Areas

- Examine elements for damage and deterioration. Assess asphalt pavement and asphalt overlay on concrete pavement; look for cracking, surface deformation, potholes, and riding surface defects. Check previously repaired areas for further deteriorations.
- Assess concrete pavement; look for surface wearing, cracks (isolated or map pattern), scaling, delamination and spalls (potholes) in the concrete; for concrete slab setting, heaving and blowups; and for exposed steel reinforcement.
- Examine signage, markings, ramps, and equipment for deterioration.

# 4.11.2 Site Development

• Assess elements such as fences, walls, and miscellaneous structures. Assess elements for overall condition, damage and deterioration.

# 4.11.3 Landscaping and Irrigation

• Assess plantings, grasses and piping system.



• Examine grass and landscaped areas for ponding, erosion and that they are graded sloping away from structures. Assess storm water detention and retention ponds, for overall condition and silting.

#### 4.11.4 Site Utilities

- Assess storm inlets and other elements not already assessed.
- Assessors shall not enter the drain pipe or inlet! All assessments shall be performed from outside the inlet or drain pipe.
- For reinforced concrete pipe, look for cracking, and spalling and/or scaling present within pipe, particularly on the invert. Look for exposed steel reinforcement due to spalling or wear.
- Assess overall pipe alignment, for signs of settlement or other movement, and for misalignment at the pipe joints. Look for buildup of silt and debris causing blockage of flow.
- Examine ground or roadway surface above pipe for unusual geologic conditions such as washouts or holes, indicating erosion and/or exfiltration problems.
- For corrugated metal pipe, check for shape and alignment (vertical and horizontal) of pipe. Examine seams and joints in pipe for misalignment and infiltration/exfiltration. Examine metal (aluminum or steel) for hydraulic wear in the invert, and rust and corrosion particularly in the invert.
- Examine pipe and approach waterways for buildup of silt and debris causing blockage of flow.
- Examine ground or roadway surface above pipe for unusual geologic conditions such as washouts or holes, indicating erosion and/or exfiltration problems.
- For concrete or brick inlets, look for impact damage, cracks, scaling, delamination and spalls in concrete and/or mortar and exposed steel reinforcement. Check grates for cracks and damage. Look for accumulation of brush and debris in and around the inlet that inhibits the flows into or out of the inlet. Assess whether the grade around the inlet provides adequate flow to the inlet.



# Appendix A: Field Condition Assessment Form

#### How to Use This Form

The assessment team captures on this form the condition of each system and subsystem. This is the first step of the calculation of an overall facility score. For each component (e.g., Columns), assessors shall record the percentage of that component that is found to have a certain rating score (e.g., how much of the Columns are 4.0-Good, how much are 3.0-Marginal, etc.). Using those percentages, a weighted average is calculated at the subsystem level. For instance, 10% of the Columns might be rated a 4, 60% a 3, and 30% a 2.

To determine the condition rating for each subsystem, the assessment team should establish the criticality of each component and evaluate the condition of each component of a particular subsystem. Each component may fall into several condition states. The assessment team should record the range of condition states for all of the components. Using that information, a weighted average for each condition state for the subsystem can be calculated. This procedure takes into consideration the relative importance of each component with respect to the subsystem. For example, the assessment team may determine that the basement insulation is less critical to the overall condition of the basement than the floor underpinning system and the overall subsystem condition state values will be calculated accordingly. Alternatively, the assessment team may determine that all components have equal criticality, and the resulting subsystem values are calculated as equal weights of the component percentages in each condition state.

						F	ercent of As	set Quantity	by Condition	n	
System	Subsystem	Component	Asset	Criticality	Enter N/A if	5	4	3	2	1	Score
- ,			7.00000		not present	Excellent	Goood	Adequate	Marginal	Poor	
Substructure	9			$\triangleright$							1.7
	Foundation		*	$\ge$		37.78	2.13	2.75	2.60	2.00	2.1

A weighted average rating for the Foundation subsystem is calculated, rounded to one decimal point; in the above case for example, the Foundation is rated 2.1. The condition rating for a system is computed as the average for the subsystem ratings rounded down to the nearest tenth of a point.

						P	ercent of As	set Quantity	by Condition	n	
System	Subsystem	Component	Asset	Criticality	Enter N/A if not present	5 Excellent	4 Goood	3 Adequate	2 Marginal	1 Poor	Score
Substructur	e			$\ge$							1.7
	Foundation		*	$\succ$		37.78	2.13	2.75	2.60	2.00	2.1
	Basement			$\ge$		1.67	30.00	1.67	0.00	0.00	1.3

The calculated system score is entered in the highlighted cell in the row containing the system's label. If a component, subsystem or system is not present at a specific facility, enter "N/A" into the "Present?" column. A Score should not be entered for any component unless it is flagged as an Asset. In that case, a score will be calculated for that component, but the subsystem score will still be computed in the manner above.



Following is a sample building assessment form:

Assessr	nent Date:		Assesso	r(s) Nam	ne(s):						
Facility	Name:										
Facility	Type: Adn	ninistration / Maintenance /	Passeng	er / Par	king (cire	cle one)					
Addres	s/Location:										
								Overal	l Buildin	g Rating	3.0
						Р	ercent of As	set Quantity	by Conditio	n	
System	Subsystem	Component	Asset	Criticality	Enter N/A if not present	5 Excellent	4 Goood	3 Adequate	2 Marginal	1 Poor	Score
Substructur	e			$\searrow$							1.7
	Foundation		*			37.78	2.13	2.75	2.60	2.00	2.1
		Walls		2		100					$\ge$
		Columns		3			10	60	30		$\geq$
		Piles		2		50	50				$\ge$
		Slab		2		20	20	20	20	20	$\ge$
	Basement			$\geq$		1.67	30.00	1.67	0.00	0.00	1.3
		Facing materials		1		10	80	10			$\ge$
		Insulation		1			100				$\geq$
		Floor underpinning		2							$\ge$
		Crawl space		2							$\ge$
Shell				$\geq$							3.7
	Superstructure,	/Structural Frame	*	$\geq$		23.57	31.43	30.71	14.29	0.00	3.6
		Beams		3		10	80	10			$\geq$
		Columns/Pillars		3				100			$\geq$
		Walls		1				100			$\ge$
		Girts		2			100				$\ge$
		Rafters		2					100		$\ge$
		Purlins		3		100			l I		$\left \times\right $



	Roof		*	$\geq$	0.00	100.00	0.00	0.00	0.00	4.0
		Surface material		2		100				$\ge$
		Gutters/downspouts		3		100				$\boldsymbol{\succ}$
		Eaves		1		100				$\mathbf{i}$
		Skylights		3		100				$\overline{}$
		Flashing/Chimney surrounds		2		100				$\mathbf{i}$
		Sealant		1		100				$\boldsymbol{\succ}$
	Exterior		*	$\ge$	33.33	50.00	16.67	0.00	0.00	4.2
		Windows		2	100					$\searrow$
		Doors		3		100				$\boldsymbol{\succ}$
		Walls		1			100			$\boldsymbol{\succ}$
	Shell Appurtena	ances	*	$\ge$	4,29	34.29	44.29	8.57	4.29	3.1
		Curtain wall system		2		80	20			$\searrow$
		Exterior balcony		2		10	60	30		$\overline{}$
		Fire Escape		3	10	20	50		10	$\boldsymbol{\succ}$
Interiors	1			$\searrow$	4.29	60.71	17.86	17.14	0.00	3.5
	Partitions			3	10	25	25	40		3.1
	Stairs			1		50	50			3.5
	Finishes			3		100				4.0
Conveyance	!			$\searrow$	8.00	32.00	12.00	40.00	8.00	2.9
	Elevator		*	2	20	20	20	20	20	3.0
	Escalator		*	2	20	50	20	50		3.0
	Lift		*	1		20	20	60		2.6



Plumbing	·			$\ge$						3.0
	Fixtures			$\mathbf{\mathbf{X}}$	0.00	42.73	33.64	21.82	1.82	3.2
		Appliances		1		50	50			$\times$
		Sinks		2		10	10	70	10	$\boldsymbol{\times}$
		Toilets/urinals		3		100				$\boldsymbol{\times}$
		Drinking fountains		1			100			$\boldsymbol{\times}$
		Faucets/supply lines		2		50	50			$\boldsymbol{\times}$
		Drainage pipes		2			50	50		$\boldsymbol{\times}$
	Water Distribu	tion		$\searrow$	30.00	17.00	19.00	11.00	23.00	3.2
		Piping		2	100					$\ge$
		Water heater	*	3		10	10	10	70	1.6
		Booster pump	*	2	50	20	30			4.2
		Well	*	1		100				4.0
		Well pump	*	2			50	40	10	2.4
	Sanitary Waste			$\geq$	8.57	27.86	25.00	25.00	13.57	2.9
		Ejector/grinder pump	*	3		50	50			3.5
		Wastewater treatment package plant	*	2			50	50		2.5
		Septic tank	*	3				50	50	1.5
		Septic field	*	1	50	50				4.5
		Piping		2	20	20	20	20	20	$\times$
		Oil-water separator	*	3	10	50	20	20		3.5
	Rain Water Dra	inage		$\ge$	20	20	20	20	20	3.0



HVAC				$\triangleright$						3.0
	Energy Supply			$\ge$	8.00	32.00	32.00	20.00	8.00	3.1
		Electrical conduit		3		40	40	20		$\times$
		Fuel/gas lines		2	20	20	20	20	20	$\ge$
	Heating/Coolin	g Generation and Distribution Systems		$\ge$	4.55	13.64	37.27	40.00	4.55	2.7
		Boiler	*	1	20	20	20	20	20	3.0
		Cooling Tower	*	3	10	10	30	40	10	2.7
		Air Handler	*	2		50	50			3.5
		Chiller	*	2			100			3.0
		Piping		3				100		$\ge$
	Testing, Balanc	ing, Controls and Instrumentation		$\triangleright$	33.33	22.22	33.33	11.11	0.00	3.8
		Valves		3	100					$\ge$
		Dampers		2		100				$\ge$
		Sensors		3			100			$\ge$
		Instruments		1				100		$\times$
	Chimneys/Vent	S		$\ge$	0.00	14.17	32.50	32.50	20.83	2.4
		Fans		2			50	50		$\ge$
		Ductwork		3		25	25	25	25	$\ge$
		Flues/cleanouts/caps		1		10	20	20	50	$\ge$
Electrical (n	on-generator)			$\ge$						3.0
	Electrical Servio	e and Distribution		$\searrow$	14.00	20.00	14.00	20.00	32.00	2.6
		Incoming service	*	3	10	20	10	20	40	2.4
		Panel (and breakers)	*	2	20	20	20	20	20	3.0
	Lighting and Bra	anch Wiring		$\searrow$	20.00	44.00	12.00	16.00	8.00	3.5
		Wiring		2	50	50				$\ge$
		Fixtures	*	2		50	20	30		3.2
		Switches and receptacles		1		20	20	20	40	$\ge$
	Other Electrica	System-Related Elements		$\triangleright$	0.00	38.00	8.00	54.00	0.00	2.8
		Lightning protection		2		20	20	60		$\ge$
		Emergency lighting		3		50		50		$\ge$



Fire Protecti	ion (specify type	e: Dry; Wet; Pre-action; Deluge; Chemical)		$\ge$						3.2
	Sprinklers		*	$\square$	30.00	13.33	0.00	43.33	13.33	3.0
		Piping		2	20	20		40	20	$\ge$
		Heads		1	50			50		$\boldsymbol{\times}$
	Standpipes		*	$\searrow$	0.00	66.67	0.00	33.33	0.00	3.3
		Piping		2		100				$\ge$
		Hose connections		1				100		$\ge$
	Hydrants and C	Other Fire Protection Specialties		$\searrow$	3.85	42.31	42.31	9.23	2.31	3.4
		Pump	*	1	50	50				4.5
		Tank	*	3		50	10	30	10	3.0
		Compressor	*	2			100			3.0
		Valves	*	1		50	20	30		3.2
		Controls	*	3		100				4.0
		Anunciators	*	3			100			3.0
Security				$\searrow$	15.56	30.00	13.33	31.11	10.00	3.1
		Sensors		2		50		50		$\succ$
		Cameras	*	1	50	50				4.5
		Controls	*	3	20	20	20	20	20	3.0
		Anunciators		3	10	20	20	40	10	$\times$
Equipment				$\ge$	0.00	40.00	60.00	0.00	0.00	3.4
	Lifts		*	2		100				4.0
	Cranes		*	3			100			3.0
Generator					0.00	27.50	27.50	45.00	0.00	2.8
	Generator		*	1		50	50			3.5
	Transfer switch	1	*	3		20	20	60		2.6



	Criticality			
Score	Definition			
3	Critcal- Failure would have significant adverse impacts			
2	Major- Failure would have moderate adverse impacts			
1	Minor - Failure would have minimal impacts			
N/A				
	Building Level Score is average of the system rounded down to	o the neare	est tenth po	int
	System Criticality Rating assigned by the inspector based on sa	afety critica	ality	
	System Score is the average of the subsystem scores rounded	down to th	ne nearest 1	L0th
	Subsystem Score is average of the subsystem condition rating	weighed by	y their cond	lition
	score (1-5)			
	Subsystem Condition Ratings is average of the component cor	ndition rati	ngs weighte	ed by their
	criticality score.			
	Component Condition rating assigned by the inspector based	visually insp	pection. Thi	s a the
	percentage of the components that would receive the conditi	on rating 1	-5.	
	Component Criticality rating assigned by inspector based on ir	npact to ov	ver building	's
	subsystem. The possible scores are 1 (limited impact), 2 (mod	erate impa	ct), or 3 (se	vere
	impact).			



# Appendix B: (Critically) Damaged or In Need of Immediate Repair (DINIR) Form

Rating 1 (Poor) – Make and attach multiple copies of form as needed; bind as one log

Assessment Date:	Assessor(s) Name(s):					
Facility Name:						
Facility Type: Administration, Maintenance, Passenger or Parking (circle)						
Address/Location:						

Subsystem	Component	Percentage
Exact Location	·	
Description of Deficiency		
Possible Solution, Structural Review or D	etail Review	



# Photographs



# Appendix C: Quality Control: Pre-Assessment Checklist

Quality Control (QC) refers to the act of taking measurements, testing, and inspecting a process or product to assure that it meets specification. The below Pre-Assessment Checklist assists the condition assessment team in verifying that s/he has all materials required for the successful completion of the facility inspection.

Assessment Date:	Assessor(s) Name(s):					
Facility Name:						
Facility Type: Administration, Maintenance, Pas	senger or Parking (circle)					
Address/Location:						

- Verify initial contact e-mail has been sent.
- Confirm assessment 3 days prior to assessment
- Confirm with facility contact: arrival time, where the team should park and who the team should meet with a phone number.
- Exchange contact information with cell number with all team members, print directions and a team meeting point before meeting with facility contact.
- Print and fill out basic information on assessments forms, including an extra set offorms.
- Print copies of the Critically Damaged, Rating of 1 Log.
- Have copies of Rating Guide and Assessment Procedure for all members.
- Camera for Critically Damaged, Rating of 1 Log.

Assessor(s) Initials:



# Appendix D: Quality Control: Post-Assessment Checklist

The Post-Assessment Checklist assists the assessment team's verification that it has completed all steps of a facility condition assessment. Complete this checklist while still on-site.

Assessment Date:	Assessor(s) Name(s):				
Facility Name:					
Facility Type: Administration, Maintenance, Pas	senger or Parking (circle)				
Address/Location:					

- Exchange Assessments Forms with other members of the condition assessment team and verify 10% for the data.
- Exchange Critically Damaged, Rating of 1 Log with other assessors and verify 100% for the data.
- Check that all exchanged forms and logs are completely filled out.
- Check that data rows add up to 100%
- After the Assessment Forms have been checked, initial the forms in Assessor Name block.
- Review all camera photos for Critically Damaged, Rating of 1 Log to ensure quality photos.
- Meet with facility contact and inform them of any 1 ratings.

#### Assessor(s) Initials:



# Appendix E: Quality Control: Delivery Checklist

The Delivery Checklist assists the condition assessment team in his/her efforts to accurately package and submit all facility assessment materials.

Assessment Date:	Assessor(s) Name(s):	
Facility Name:		
Facility Type: Administration, Maintenance, Passenger or Parking (circle)		
Address/Location:		

- Check that Assessment forms are scanned and filed appropriately.
- Spot check the percent calculations are correct.
- Select 2 or 3 facilities, checking all forms follow the calculations through the entire process.
- Check that the data is archived.
- Check that all deficiency logs have been sent to the MDOT MTA project manager.
- Check that the e-mails sending the deficiency log have been archived

#### Assessor(s) Initials:



# Appendix F Quality Assurance: Quality Assurance Checklist

The Quality Assurance Checklist contains several steps that the MDOT Asset Management team and the local facility administrators complete to ensure the successful execution of each facility condition assessment.

Date:	Name:	
Facility Name:		
Facility Type: Administration, Maintenance, Passenger or Parking (circle)		
Address/Location:		

- During the project check that checklists are been filled out.
- Select 2 or 3 facilities, checking that all forms support the calculations through the entire process.
- Check archives.



# Appendix G: Facility Condition Rating Guide

Note: This is the document with rating descriptions and photos for each component.

Appendix G: Facility Condition Rating Guide

A-1. Substructure	Procedure
<u>Foundations</u> : Inspect walls, columns, pilings, other structural components for signs of decay.	Look for out of plumb, gaps, spalls, delamination, cracks, missing or cracked mortar, missing or cracked bricks, moisture, stains, organic growth, rust and damage.
TERM Rating	Description
5: Excellent	New construction; no visible defects.
4: Good	Minor improvement or superficial repairs needed; can be addressed through routine maintenance. No significant visible damage such as cracking, spalling, sagging, rust, or shifting.

3: Adequate	Needs some repair. There may be surface cracking, rust, shifting, a spalling on elements. Insulation or drainage may need maintenance Foundation is cosmetically "fair" and functioning as designed.	and ce.
2: Marginal	Components need extensive repair at a minimum. They show signs of significant cracking, sagging, rust, shifting, and spalling/decay. Significant insulation or drainage issues may be present. There are no apparent safety issues, however, and components are function	s 2 ial.
1: Poor	Components show critical defects affecting function, health, or safety. They are visibly in poor condition and cannot be repaired; must be replaced. They warrant structural review.	

A-2. Substructure	Procedure
Basement: Inspect non-foundation and structural components such as facing materials, insulation, slab, floor underpinnings, crawl spaces, etc.	Look for out of plumb, out of level, gaps, spalls, delamination, cracks, missing or cracked mortar, missing or cracked bricks, moisture, stains, organic growth, rust, failing finishes and damage.
TERM Rating	Description
5: Excellent	New construction; no visible defects.
4: Good	Minor improvement or superficial repairs needed; can be addressed through routine maintenance. No significant visible damage such as cracking, spalling, sagging, rust, or shifting.

3: Adequate	Needs some repair. There may be surface cracking, rust, shifting, an spalling on components. Insulation or drainage may need maintenance. Basement is cosmetically "fair" and functioning as designed.
2: Marginal	Components need extensive repair at a minimum. They show signs of significant cracking, sagging, rust, shifting, and spalling/decay. Significant insulation or drainage issues may be present. There are no apparent safety issues, however, and components are functional.
1: Poor	Components show critical defects affecting function, health, or safety. They are visibly in poor condition and cannot be repaired; must be replaced. They warrant structural review.

B-1. Shell	Procedure
Superstructure/Structural Frame: Inspect superstructure/structural frame, including columns, pillars, and walls.	Look for out of plumb, out of level, gaps, spalls, delamination, cracks, missing or cracked mortar, missing or cracked bricks, moisture, stains, organic growth, rust and damage.
TERM Rating	Description
5: Excellent	New construction; no visible defects.
4: Good	Minor improvement needed; components are functioning without issue under routine maintenance. Only minor superficial damage or defects. No sagging, corrosion, cracking, shifting, or leaks.



B-2. Shell	Procedure
<u>Roof</u> : Inspect roof surface (tiles, membrane, shingles, gravel, etc.), gutters, eaves, skylights, flashing, chimney surrounds, and sealants, hardware and painted or coated surfaces.	Inspect for deterioration that may allow water penetration. Look for blisters, cracks, wrinkles, damage and evidence of ponding.
TERM Rating	Description
5: Excellent	New construction; no visible defects.
	If the roof is not observed, this rating is assigned if the age of the roof is in the first quintile of its life expectancy.
4: Good	Minor improvement needed; sub-components are functioning without issue under routine maintenance. Only minor superficial damage or defects. No sagging, corrosion, cracking, shifting, or leaks.
	If the roof is not observed, this rating is assigned if the age of the roof is in the second quintile of its life expectancy.

3: Adequate	Repairs are needed. Component or sub-components show signs of minor cracking, drainage issues, sagging, corrosion, or shifting. They are cosmetically "fair" but functioning as designed. If the roof is not observed, this rating is assigned if the age of the roof is in the third quintile of its life expectancy.
2: Marginal	Components or sub-components show signs of significant cracking, sagging, swelling, corrosion, leaks, or shifting. Significant repairs are needed, but there currently does not appear to be a safety issue on any single sub-component. If the roof is not observed, this rating is assigned if the age of the roof is in the fourth quintile of its life expectancy.
1: Poor	Components or sub-components have critical defects affecting function, health, or safety. The roof is in visibly poor condition and must be replaced rather than repaired. If the roof is not observed, this rating is assigned if the age of the roof is in the fifth quintile of its life expectancy.

B-3. Shell	Procedure
Exterior: Inspect windows, doors, and all finishes (paint, masonry).	Look for gaps, damage, evidence of condensation or broken panes, and scratches.
TERM Rating	Description
5: Excellent	New construction; no visible defects.
4: Good	Minor improvement needed; sub-components are functioning without issue under routine maintenance. Only minor superficial damage or defect. No sagging, corrosion, cracking, shifting, or leaks.



B-4. Shell	Procedure
Shell Appurtenances: Inspect façade, curtain wall system, glazing system, exterior sealants, exterior balconies, fire escapes, gutters, downspouts.	Look for out of plumb, damage, gaps and cracks. Look for condensation, scratches, broken panes, and clogged downspouts and gutters.
TERM Rating	Description
5: Excellent	New construction; no visible defects.
4: Good	Minor improvement needed; sub-components are functioning without issue under routine maintenance. Only minor superficial damage or defect. No sagging, corrosion, cracking, shifting, or leaks.



C-1. Interiors	Procedure
Partitions: Inspect walls, interior doors, fittings, ceiling tiles and signage.	Look for damage, evidence of leaks, cracks, and gaps.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
4: Good	Minor improvement needed; only shows superficial damage or defects. Minimal signs of wear; no major problems; minimal signs of deterioration. Primarily cosmetic issues with no functional impact, which can be addressed through routine maintenance.


C-2. Interiors	Procedure
<u>Stairs</u> : Inspect interior stairs and landings including fire and access issues.	Look for damage and deterioration to treads, risers, rails and landings.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
A: Coad	Mingr improvement needed, only shows superficial damage or
4: Good	Minor improvement needed; only shows superficial damage or
	deterioration. Primarily cosmetic issues with no functional impact
	which can be addressed through routine maintenance.



C-3. Interiors	Procedure
<u>Finishes</u> : Inspect materials used on walls, floors, and ceilings, such as tile, paint, and other coatings.	Inspect wear, damage, cracks, chips, peeling paint, movement, rips, stains and worn edges.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
4: Good	Minor improvement needed; sub-components show superficial
	damage or defects. Minimal signs of wear; no major problems; minimal signs of deterioration. Primarily cosmetic issues with no functional impact which can be addressed through routine maintenance.



D-1. Conveyance	Procedure
<u>Elevators</u> : Inspect condition, function, and code compliance of walls, flooring, doors, and button panel.	Inspect for overall condition, unusual noises, call buttons, door automatic reopen-when-obstructed function, in car controls, hallway lanterns, audible signals and jamb signage.
	Check for annual certification of inspection.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
4: Good	Minor improvement needed; only shows superficial damage or defects with no functional impact. Issues are addressed via routine maintenance.



D-2. Conveyance	Procedure
Escalators: Inspect condition, function, and code compliance of treads, stair walls, handrail belts, and landings.	Inspect for overall condition, unusual noise/vibrations, comb teeth, landing plate, steps, that handrail moves at same speed as steps, wedge guards and stop buttons.
	Check for annual certification of inspection.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
4: Good	Minor improvement needed; only shows superficial damage or
	defects with no functional impact. Issues are addressed via routine maintenance.

3: Adequate	Repairs are needed; components show signs of corrosion and damage. They are cosmetically "fair" but functioning as intended under routine maintenance schedule.
	3.0-Adequate scores are for portions of the facility that require repairs. This escalator is undergoing repair.
2: Marginal	Components or sub-components need extensive repair at a minimum. More substantial part replacement and/or repair is frequent. There currently does not appear to be any safety issue. Maintenance schedule is interrupted by more frequent breakdowns.
1: Poor	Components or sub-components have critical defects affecting function. They are in visibly poor condition and must be replaced rather than repaired. Maintenance schedule is reactive rather than proactive due to frequent malfunction. Escalator warrants detailed review. (Or, missing annual certificate of inspection.)

D-3. Conveyance	Procedure
<u>Lifts</u> : Inspect the walls, latches, ramp, and surface of any other fixed apparatuses used for the movement of goods or people for condition,	Inspect for overall condition, unusual noises, call buttons, doors, door automatic reopen-when-obstructed function, in car controls, hallway lanterns, audible signals and jamb signage.
function, code compliance.	Check for annual certification of inspection.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
4: Good	Minor improvement needed; only shows superficial damage or defects with no functional impact. Issues are addressed via routine maintenance.

3: Adequate	Repairs are needed; components show signs of corrosion and
	damage. They are cosmetically "fair" but functioning as intended
	under routine maintenance schedule.
2: Marginal	Components or sub-components need extensive repair at a
	minimum. More substantial part replacement and/or repair is
	frequent. There currently does not appear to be any safety issue.
	Maintenance schedule is interrupted by more frequent breakdowns.
1. D	
1: Poor	Components or sub-components have critical defects affecting
	function. They are in visibly poor condition and must be replaced rather than repaired. Maintenance schedule is reactive rather than proactive due to frequent malfunction. Lift warrants detailed review. (Or, missing annual certificate of inspection.)

E-1. Plumbing	Procedure
<u>Fixtures</u> : Inspect lavatories, toilets, urinals, other sinks, drinking fountains and faucets.	Inspect for cracks, damage, and leaks. Visually inspect caulking adjacent to surface.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
4: Good	Minor wear and tear or superficial deterioration or defect with no functional impact typically addressed through routine maintenance. No corrosion or leaks.



E-2. Plumbing	Procedure
Water Distribution: Inspect piping.	Inspect for corrosion, distortions and deterioration.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
4: Good	Minor wear and tear or superficial deterioration or defect with no functional impact typically addressed through routine maintenance. No corrosion or leaks.

3: Adequate	Repairs are needed; some deterioration exists such as corrosion.
	Repairs are typical to more intensive routine maintenance. System is
	functioning as designed.
2: Marginal	Water distribution piping needs extensive repair at a minimum.
	Currently does not appear to be any safety issue.
1: Poor	Water distribution piping defects affect function and necessitate frequent maintenance.
	Piping is in poor condition and must be replaced rather than repaired.
No photo available. Please find additional information on this subsystem in Section 4.6.2 of the Guidebook.	

E-3. Plumbing	Procedure
Sanitary Waste: Inspect piping.	Inspect for corrosion, distortions and deterioration.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
4: Good	Minor wear and tear or superficial deterioration or defect with no functional impact typically addressed through routine maintenance. No corrosion or leaks.



E-4. Plumbing	Procedure
Rain Water Drainage: Inspect piping.	Inspect for corrosion, distortions and deterioration.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage.
4: Good	Minor wear and tear or superficial deterioration or defect with no functional impact typically addressed through routine maintenance. No corrosion or leaks.



F-1. HVAC	Procedure
Energy Supply: Inspect disconnects and wiring.	Inspect for physical damage, corrosion, missing covers and exposed wiring.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage. Meets efficiency and capacity goals and maintains desired temperature and air quality throughout the facility.
NON POTALE WATER	
4: Good	Minor deterioration or defect with no functional impact typically
	addressed through routine maintenance.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance needs are significant. With these, the system meets needs. Energy supply components are functional
No photo available. Pl the Guidebook.	ease find additional information on this subsystem in Section 4.7.1 of
2: Marginal	Energy supply components fail to meet standards or needs. Components need extensive repair at a minimum. Currently does not appear to be any safety issue.
No photo available. P the Guidebook.	lease find additional information on this subsystem in Section 4.7.1 of
1: Door	Energy supply components have critical defects affecting
1. Poor	function; issues are beyond repair and require replacement.

F-2. HVAC	Procedure
<u>Heating/Cooling Generation and</u> <u>Distribution Systems</u> : Inspect Boilers, chillers, AHUs piping.	Inspect for damage, leaks, corrosion, and audible evidence of deterioration.
ductwork, VAVs, unit heater and	Check boiler for annual certificate of inspection.
and split unit air conditioning.	
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage. Meets efficiency and capacity goals and maintains desired temperature and air quality throughout the facility.
: Good	Minor deterioration or defect with no functional impact typically
	addressed through routine maintenance.



F-3. HVAC	Procedure
Testing, Balancing, Controls, and Instrumentation: Inspect valves, dampers, sensors and instruments.	Inspect for damage, deterioration, and malfunction.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage. Meets efficiency and capacity goals and maintains desired temperature and air quality throughout the facility.
4: Good	Minor deterioration or defect with no functional impact typically addressed through routine maintenance.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance needs are significant. With these, the system meets needs. Controls, instrumentation, and balancing components are functional.
2: Marginal	Controls, instrumentation and balancing components fail to meet
	standards or needs. Components need extensive repair at a minimum. Currently does not appear to be any safety issue
	initiation currently does not appear to be any survey issue.
No photo available. Please find	additional information on this subsystem in Section 4.7.3 of
the Guidebook.	
4. De co	
1: Poor	defects affecting function; issues are beyond repair and warrant require replacement.
No photo available. Please find	additional information on this subsystem in Section 4.7.3 of
the Guidebook.	

F-4. HVAC	Procedure
<u>Chimneys and Vents</u> : Inspect exhaust fans, ductwork, flues, cleanouts and caps.	Inspect for damage, corrosion, leaks, and deterioration. Audibly inspect fans for indications of damaged motors or blades.
TERM Rating	Description
5: Excellent	New construction; no visible defects or damage. Meets efficiency and capacity goals and maintains desired temperature and air quality throughout the facility.
4: Good	Minor deterioration or defect with no functional impact typically addressed through routine maintenance.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance needs are significant. With these, the system meets needs. Chimney
No photo available. Please f the Guidebook.	ind additional information on this subsystem in Section 4.7.4 of
2: Marginal	Chimney and vent components fail to meet standards or needs. Components need extensive repair at a minimum. Currently does not appear to be any safety issue.
No photo available. Please f the Guidebook.	find additional information on this subsystem in Section 4.7.4 of
1: Poor	Chimney and vent components have critical defects affecting function; issues are beyond repair and require replacement.
No photo available. Please f the Guidebook.	ind additional information on this subsystem in Section 4.7.4 of



3: Adequate	Repairs are needed; some deterioration exists, and maintenance
	needs are significant. With these, the system meets requirements.
	Sprinklers or components are functional.
2: Marginal	Sprinklers or components have widespread defects; no longer meets
	needs or current standards and requires partial replacement at a minimum. Currently does not appear to be any safety issue.
1: Poor	Sprinklers or components have critical defects affecting function and ability to meet standards. Issues are beyond repair and require replacement.

G-2. Fire Protection	Procedure
Standpipes: Inspect piping and hose connections.	Inspect for corrosion, leaks, and damage. Ensure that all caps are in place and in good condition.
TERM Rating	Description
5: Excellent	New standpipes and hydrants; no visible defects or damage. Meets facility needs.
4: Good	Minor wear and tear; standpipes may be slightly outdated but still meet needs of facility with routine maintenance.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance needs are significant. With these, standpipes meet requirements. Standpipes are functional.
No photo available. Pl the Guidebook.	ease find additional information on this subsystem in Section 4.8.2 of
2: Marginal	Standpipes have widespread defects; no longer meet needs or current standards and require partial replacement at a minimum. Currently does not appear to be any safety issue.
No photo available. P the Guidebook.	lease find additional information on this subsystem in Section 4.8.2 of
1: Poor	Standpipes have critical defects affecting function and ability to meet standards. Issues are beyond repair and require replacement.
No photo available. Pl the Guidebook.	ease find additional information on this subsystem in Section 4.8.2 of

G-3. Fire Protection	Procedure
Hydrants and Other Fire Protection Specialties: Inspect fire alarms, smoke evacuation, stairwell pressurization and other related features.	Inspect for overall condition.
TERM Rating	Description
5: Excellent	New components; no visible defects or damage. Meet facility needs.
4: Good	Minor wear and tear; components may be slightly outdated but still meet needs of facility with routine maintenance.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance needs are significant. With these, the fire protection system meets
	requirements. Specialized components are functional.
2: Marginal	Specialized components have widespread defects; no longer meet
	minimum. Currently does not appear to be any safety issue.
1: Poor	Specialized components have critical defects affecting function
	require replacement.

H-1. Electrical	Procedure
Electrical Service & Distribution: Inspect cable, wires, cabinets, breakers, panel boards and grounding.	Inspect for damage, proper protection, defective equipment (indicated by testing tags), missing covers, and cleanliness.
TERM Rating	Description
5: Excellent	New electrical service and distribution; no apparent defects. Meets facility needs.
4: Good	Minor deterioration; electrical service and distribution components may be slightly outdated but still meet needs of facility with routine
	maintenance. Limitation on system flexibility such as future expansion.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance
	needs are significant. There is limited flexibility for improvement.
	However, electrical service and distribution components meet
2: Marginal	Electrical service and distribution components have widespread
	defects; no longer meet needs or current standards and require
	partial replacement at a minimum. Currently does not appear to be
	any safety issue.
1: Poor	Electrical service and distribution components have critical
	defects affecting function and ability to meet standards. Issues
	are beyond repair and require replacement.

H-2. Electrical	Procedure
Lighting & Branch Wiring (interior and exterior): Inspect wiring and devices.	Inspect the structural integrity of the light fixtures, supports, anchorages, boxes and conduits. Inspect for exposed wiring, missing covers, and corrosion.
TERM Rating	Description
5: Excellent	New wiring and components; no apparent defects. Meets facility needs.
4: Coad	Minor deteriorition wiring and components may be slightly
4: Good	Minor deterioration; wiring and components may be slightly outdated but still meet needs of facility with routine maintenance. Limitation on system flexibility such as future expansion.


H-3. Electrical	Procedure
<u>Communications &amp; Security</u> : Inspect wiring and devices.	Inspect the structural integrity of the supports, anchorages, boxes and conduits. Inspect conduits and boxes for damage, exposed wiring, missing covers and corrosion.
TERM Rating	Description
5: Excellent	New communications and security subsystem; no apparent defects. Meets facility needs.
4: Good	Minor deterioration; communications and/or security subsystems or
	components may be slightly outdated but still meet needs of facility with routine maintenance. Limitation on subsystem flexibility such as future expansion.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance
	needs are significant. There is limited flexibility for improvement.
	However, the communications and security subsystems meet
	requirements and are still within their useful lives.
No photo available. Please find	additional information on this subsystem in Section 4.9.3 of
the Guidebook.	
2: Marginal	Communications and/or security subsystems or components have
	widespread defects; no longer meet needs or current standards and
	require partial replacement at a minimum. Currently does not
	appear to be any safety issue.
No photo available. Please find	additional information on this subsystem in Section 4.9.3 of
the Guidebook.	
1: Poor	Communications and/or security subsystems or components have
	critical defects affecting function and ability to meet standards.
	Issues are beyond repair and require replacement.
No photo available. Please find	additional information on this subsystem in Section 4.9.3 of
the Guidebook.	

H-4. Electrical	Procedure
Other Electrical System-Related Elements: Inspect such features as lightning protection, generators, and emergency lighting.	Inspect for overall condition features such as lightning protection, generators, and emergency lighting. Inspect for damage, exposed wiring, missing covers, corrosion. Inspect generators for leaks.
TERM Rating	Description
5: Excellent	New components; no apparent defects. Meet facility needs.
4: Good	Minor deterioration; components may be slightly outdated but still meet needs of facility with routine maintenance.

Repairs are needed, some deterioration exists, and maintenance
needs are significant. There is limited flexibility for improvement of
the facility. However, the components meet requirements and are
functional.
Components have widespread defects: no longer meet needs or
current standards and require partial replacement at a minimum.
Currently does not appear to be any safety issue.
Components have critical defects affecting function and ability to meet standards. Issues are beyond repair and require replacement.

I. Equipment (Maintenance and Administration Facilities ONLY)	Procedure
Equipment related to the function of the facility (including maintenance or vehicle service equipment; equipment valued between \$10K and \$50K): Inspect equipment.	Inspect equipment and electrical power for overall condition.
TERM Rating	Description
5: Excellent	New equipment; no apparent defects; serving the needs of the facility.
4: Good	Minor deterioration; equipment may be slightly outdated but still meets needs of facility with routine maintenance.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance needs are considerable. However, equipment meets needs and is still functional.
2: Marginal	Equipment has widespread defects; no longer meets needs or current standards and requires partial replacement at a minimum.
No photo available. Please find the Guidebook.	additional information on this subsystem in Section 4.10 of
1: Poor	Equipment has critical defects affecting function and ability to meet standards. Issues are beyond repair and require replacement.
No photo available. Please find Guidebook.	additional information on this subsystem in Section 4.10 of the

J-1. Fare Collection (Passenger and Parking Facilities ONLY)	Procedure
Fare Collection-related Equipment: Inspect equipment.	Inspect equipment and electrical power for overall condition. Determine if equipment is operating properly by interviewing the building manager.
TERM Rating	Description
5: Excellent	New equipment; no apparent defects; serving the needs of the facility.
No photo available. Please find the Guidebook.	additional information on this subsystem in Section 4.11.1 of
4: Good	Minor deterioration; equipment may be slightly outdated but still meets needs of facility with routine maintenance.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance needs are considerable. However, equipment meets needs and is still functional.	
No photo available. Please find the Guidebook.	No photo available. Please find additional information on this subsystem in Section 4.11.1 of the Guidebook.	
2: Marginal	Equipment has widespread defects; no longer meets needs or current standards and requires partial replacement at a minimum.	
No photo available. Please find additional information on this subsystem in Section 4.11.1 of the Guidebook.		
1: Poor	Equipment has critical defects affecting function and ability to meet standards. Issues are beyond repair and require replacement.	
No photo available. Please find additional information on this subsystem in Section 4.11.1 of the Guidebook.		

J-2. Fare Collection (Passenger and Parking Facilities ONLY)	Procedure
Other major equipment related to the function of the facility: Inspect equipment.	Inspect equipment and electrical power for overall condition. Inspect for damage and corrosion.
TERM Rating	Description
5: Excellent	New equipment; no apparent defects; serving the needs of the facility.
4: Good	Minor deterioration; equipment may be slightly outdated but still
	meets needs of facility with routine maintenance.

3: Adequate	Repairs are needed; some deterioration exists, and maintenance needs are considerable. However, equipment meets needs and is still functional.
No photo available. Please find	additional information on this subsystem in Section 4.11.2 of
the Guidebook.	
2: Marginal	Equipment bes widespread defects, pelonger meets peeds or
	current standards and requires partial replacement at a minimum.
No photo available. Please find	additional information on this subsystem in Section 4.11.2
of the Guidebook.	
1. Do or	
1: Poor	meet standards. Issues are beyond repair and require
	replacement.
No photo available. Please find	additional information on this subsystem in Section 4.11.2 of
the Guidebook.	

K-1. Site	Procedure
<u>Roadways/driveways</u> and associated signage, markings, and equipment: Inspect components.	Inspect roadways/driveways and components for damage and deterioration, including cracking, deformation, potholes, and riding surface defects.
TERM Rating	Description
5: Excellent	New construction; no apparent defects; serving the needs of the facility.
4: Good	Minor deterioration, primarily cosmetic defects such as damaged signage or small pavement cracks. Still meets needs of facility with routine maintenance.



K-2. Site	Procedure
<u>Parking lots</u> and associated signage, markings, and equipment: Inspect paving and components.	Inspect paving and parking lots components for damage and deterioration, including cracking, deformation, potholes, and riding surface defects.
TERM Rating	Description
5: Excellent	New construction; no apparent defects; serving the needs of the facility.
4: Good	Minor deterioration, primarily cosmetic defects such as damaged signage or small pavement cracks. Still meets needs of facility with routine maintenance.



K-3. Site	Procedure
<u>Pedestrian areas</u> and associated signage, markings, and equipment: Inspect pedestrian areas and components.	Inspect pedestrian areas and components, including ramps and sidewalks, for damage and deterioration, including cracking, deformation, potholes, and riding surface defects.
TERM Rating	Description
5: Excellent	New construction; no apparent defects; serving the needs of the facility.
4: Good	Minor deterioration, primarily cosmetic defects such as damaged signage or small pavement cracks. Still meets needs of facility with routine maintenance.



K-4. Site	Procedure
Site development such as fences, walls and miscellaneous structures.	Inspect site features for overall condition, damage and deterioration.
TERM Rating	Description
5: Excellent	New construction; no apparent defects; serving the needs of the facility.
4: Good	Minor deterioration, primarily cosmetic defects such as discolored fence lattices or supports, or minor chinks in walls. Still meets needs of facility with routine maintenance.



K-5. Site	Procedure
<u>Landscaping and Irrigation</u> : Inspect plantings, grasses and piping system.	Inspect grass and landscaped areas for ponding and/or erosion and that they are graded sloping away from structures. Inspect storm water detention and retention ponds for overall condition and silting.
TERM Rating	Description
5: Excellent	New construction; no apparent defects; serving the needs of the facility.





4: Good

Minor deterioration, primarily cosmetic defects such as wilted storm water bushes. Still meets needs of facility with routine maintenance.



3: Adequate	Repairs are needed; some deterioration exists among storm water-
	critical foliage, erosion, etc. More routine maintenance is needed.
	However, landscaping and irrigation are still functioning as designed.
2: Marginal	Landscaping and/or irrigation and storm water features are worn and need extensive repair at a minimum.
	Irrigation no longer efficient, grass swales are barren, etc.
1: Poor	Landscaping and/or irrigation and storm water features have critical defects affecting function, health, or safety. Issues are

K-6. Site	Procedure
Site Utilities: Inspect storm inlets and other elements not already assessed.	Inspect piping for cracking, spalling, scaling, and overall alignment. Inspect for buildup of debris. Inspect areas around inlets for signs of erosion or exfiltration issues. Do not enter any pipes or inlets.
TERM Rating	Description
5: Excellent	New construction; no apparent defects; serving the needs of the facility.
4: Good	Minor deterioration, primarily cosmetic defects such as discoloration or evidence of minor deteriorating in previous repair. Still meets needs of facility with routine maintenance.

3: Adequate	Repairs are needed; some deterioration exists, such as dented pipe mouth or minor damage of topping roadway surface. More routine maintenance is needed. However, site utilities and/or components are still functioning as designed.
2: Marginal	Site utilities and/or components are worn and need extensive repair at a minimum.
	Pipe may be corroded to the point of deterioration. Roadway surface above the pipe may have holes greater than 2" or potholes.
No photo available. Please find of the Guidebook.	additional information on this subsystem in Section 4.12.6
1: Poor	Site utilities and/or components have critical defects affecting function, health, or safety. Issues are beyond repair and require replacement.
No photo available. Please find the Guidebook.	additional information on this subsystem in Section 4.12.6 of