



# Utility Service Co.

I N C O R P O R A T E D

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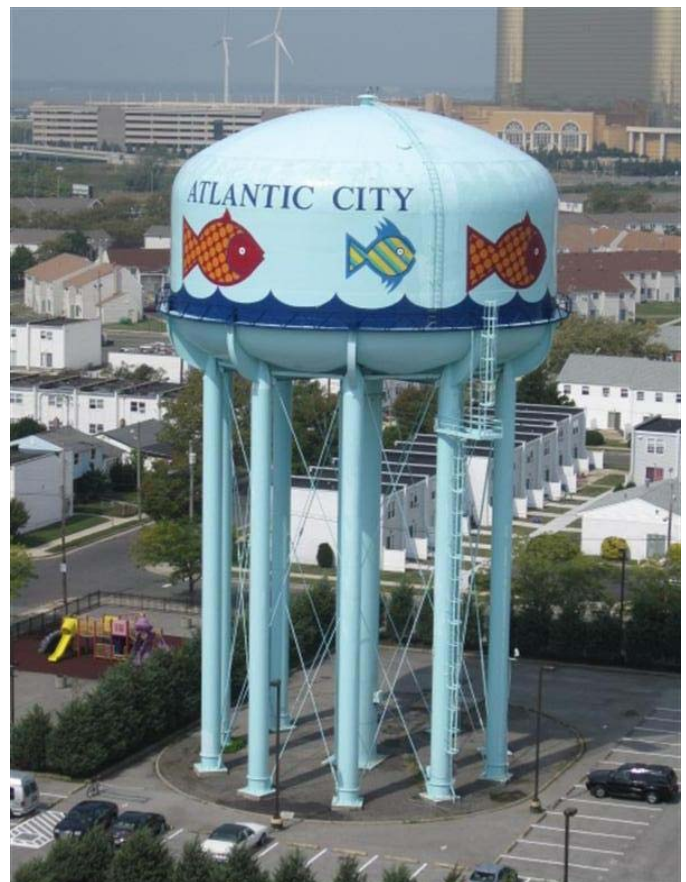
## 1,000,000 Gallon Maryland Avenue Elevated Water Storage Tank Condition Assessment Report

Atlantic City MUA, NJ

**Prepared For:**  
Neil Goldfine  
Executive Director

**Prepared By:**  
Marty Mazzella  
Water Systems Consultant

**Date:**  
October 18, 2010



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# General Information

## INTRODUCTION

On September 24, 2010, Utility Service Co., Inc. conducted a visual inspection of the 1,000,000 gallon elevated water storage tank on Maryland Avenue in Atlantic City, NJ. The purpose of the inspection was to determine the condition of the **coatings** and **structure**, and evaluate the tank for compliance with current **sanitation** guidelines, **safety** & **security** regulations and guidelines in accordance with AWWA, OSHA, New Jersey Department of Environmental Protection, US EPA, US Dept of Homeland Security, and related state and federal agencies.

The information gained from this inspection will be used to compile recommendations for maintenance and to offer a contractual agreement to provide this service. In this report, you will find a description of the current condition of this tank along with photographs to support the recommendations.

## TANK DETAILS

<b>CAPACITY:</b>	1,000,000 Gallons	<b>DESIGN:</b>	Elevated
<b>INSPECTION DATE:</b>	September 24, 2010	<b>INSPECTOR:</b>	Marty Mazzella
<b>CONSTRUCTION STYLE:</b>	Welded Steel	<b>CONSTRUCTION DATE:</b>	1953
<b>BUILDER:</b>	Pittsburg-Des Moines Steel Company	<b>HEIGHT/DIMENSION:</b>	72' Low Water Level
<b>EXTERIOR COATING:</b>	Styrenated Acrylic Clear Coat Urethane over Acrylic	<b>EXTERIOR LEAD/CHROMIUM PRESENCE:</b>	0 mg/kg Lead 0 mg/kg Chromium
<b>INTERIOR COATING:</b>	Epoxy	<b>INTERIOR LEAD/CHROMIUM PRESENCE:</b>	0 mg/kg Lead 241 mg/kg Chromium

## ESTIMATED REPLACEMENT VALUE

The replacement cost of this tank is estimated at \$ 2,300,000 to \$2,550,000.

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# **Exterior Coatings Conditions**

## **RISER, LEGS AND STRUCTURAL MEMBERS**

The exterior coating system is in fair condition. The appearance of the coating system is good to fair. The exterior coating system exhibits chalking, minor mildew growth, areas of minor to moderate corrosion, and minor delamination. There is no evidence of lead or chromium in the existing coatings. The existing coatings are 10.4 to 22.0 mils, dry film thickness. The adhesion of the existing coatings is good. Due to the thickness of the coatings and the amount of corrosion present on the structural components, as well as the fact that a clear coat finish was applied during the most recent renovation, it is not recommended to overcoat the tank exterior. (See photos # 1 -4).

## **TANK BOWL**

The coating system on the tank bowl is in fair condition. The exterior coating system on the tank bowl exhibits chalking, moderate corrosion, and mildew stains. There is some moderate corrosion on the structural beams and upper riser where it meets the bowl. (See photos #5 - 8).

## **TANK SIDEWALLS AND ROOF**

The exterior coating system on the tank sidewalls and roof is in fair condition. The appearance of the coating system on the tank sidewalls is good to fair. The clear coat finish is delaminating in several areas, but the overall appearance of the coating and "fish" logo is still good. The roof coatings are exhibiting areas of thinning, delamination of the clear coat, and some minor corrosion. (See photos # 9 - 12).

## **RECOMMENDATIONS**

- **The tank exterior is in fair condition. There are several areas of moderate to severe corrosion on the underside of the bowl and weld seams and the clear coat finish on portions of the tank is failing. Based on the age of the coating system and the conditions observed it is recommended that the tank exterior be scheduled for an for a complete renovation to include complete removal of the existing coating by abrasive blast cleaning to an SSPC-SP6 Commercial standard and application of a new 3 coat system of primer, epoxy and urethane within the next 2 years.**

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# **Interior Coatings Conditions**

## **ROOF AND AREA ABOVE HIGH WATER LEVEL**

The interior epoxy coating system on the roof plates and the area above the high water level is in fair to poor condition. The interior epoxy coating system exhibits areas of corrosion, delamination, and organic staining. (See photos # 13 - 16).

## **SIDEWALLS**

The interior epoxy coating system on the tank sidewalls is in good to fair condition. The interior epoxy coating system exhibits organic staining, likely from iron and/or manganese, and some minor active corrosion. (See photo # 13).

## **BOWL**

The interior epoxy coating system on the lower tank bowl was not visible during this inspection and was not photographed or inspected.

## **WET RISER**

The interior epoxy coating system on the tank riser was not visible during this inspection and was not photographed or inspected.

## **RECOMMENDATIONS**

- **The interior epoxy coating system appears to be in good to fair condition based on the limited view of the walls and roof. There is a light build up of organic staining on the walls and minor corrosion on the roof structure, sidewall panels, and edges.**
- **It is recommended that a full washout inspection and disinfection be performed on the tank interior to further determine the condition of the coatings. Without better visual evidence of the condition of the interior coatings a definitive recommendation cannot be made.**

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# **Safety/Sanitation/Structural/Security Conditions**

## **SAFETY**

### **Ladders**

The access ladder attached to the exterior leg is in good condition. It is not equipped with a safety climb system.

The interior ladder is in fair condition and is exhibiting corrosion on the upper rungs that were visible during the inspection. It does not contain a safety climb system.

The roof access ladder is in good condition and does not contain a safety climb system. (See photos # 17 - 23)

### **Antennas and Aviation Warning Lights**

There is an aviation warning light on this tower. (See photos # 24).

There are no communication antennas installed on the tank structure or balcony.

- **Any future plans to install communication antenna on the tank should be carefully evaluated and designed.**

### **Riser Access Hatch**

The primary riser access is a 24 inch diameter clamp style hatch that does not meet current AWWA guidelines. (See photo # 25).

- **It is recommended to add a secondary 30" bolted flange access cover with Davit arm on the opposite side of riser.**

### **Secondary Access Hatch**

There is no secondary access hatch.

## SANITATION

### Roof Hatch

The 24" round roof hatch meets current OSHA, AWWA standards and NJ DEP guidelines which require that roof hatch be a minimum of 24 inch diameter and be framed 4" to 6" above the surface of the roof at the opening and that it should be fitted with a solid watertight cover which overlaps the framed opening and extends down around the frame a minimum of two inches to prevent contaminated rainwater from entering the tank.

The roof hatch was closed but unlocked when the tank was inspected. (See photos # 27 & 28).

### Roof Vent

AWWA guidelines require that a tank have a vent, which is both freeze-proof and insect-proof, on the top of the tank to prevent contamination from birds, bats and insects. These guidelines also suggest the screen be protected from direct contact with the elements. The existing roof vent does not comply with current AWWA and NJ DEP guidelines. (See photos # 24 & 26).

- **It is recommended to replace the existing roof vent with a new aluminum frost proof, vacuum pallet vent system.**

### Overflow

AWWA guidelines require the overflows on elevated tanks and standpipes discharge at an elevation no higher than 12 to 24 inches above ground and discharge over a drainage inlet structure or splash plate. The overflow pipe on this tank enters the ground at the tank base and empties at an unknown location, likely in a catch basin in an adjacent street. The overflow outlet should be located and inspected to ensure the proper screen cover is installed over the outlet end to prevent insects, birds and vermin from entering the tank. (See photo # 29 - 30).

## STRUCTURAL

### Foundations

The concrete foundations were coated to prevent freeze-thaw damage. The coating has worn and is no longer protecting the concrete. The visible areas of the foundations are in fair condition, exhibiting some moderate to severe cracking and flaking of the concrete.

Although many of the cracks appear to be superficial, the width of a few of the cracks makes it likely that they are deeper than an inch or two. It is difficult for a crack in concrete to open wide without some depth. The depth of a crack should only be of a structural concern if it penetrates the area of the foundation that is carrying and transferring the loads, which cannot be known from visual observations of the surface.

From visual observation, the cracks do not penetrate the load bearing area of the foundation and can simply be properly cleaned and sealed. The only way to be certain of any damage to the load bearing pier is to take the worst looking pier and break away all the cracked concrete to see how far the cracks go. After the investigation is complete, form and pour a new concrete “cap” over the exposed pier, keeping in mind there are certain procedures and material considerations for bonding new concrete to old.

(See photos #31 - 34)

- **It is recommended to remove all loose and cracking concrete on the foundations, properly prepare and repair each area, then seal and coat with epoxy to protect from further deterioration.**

### Wind Rods and Sway Rods

The wind rods and sway rods appear to be in good condition. (See photo #35 - 37)

### Anchor Bolts

The anchor bolts are generally tight and in good condition. There is corrosion and significant loss on some of the nuts, and minor corrosion on several anchor bolts, but not enough to be of concern. During the next renovation, new nuts should be installed. (See photos #38 - 40)

## **SECURITY**

### Tank

The roof access hatch was closed but unlocked when the tank was inspected.

There is not a suitable ladder gate attached to the ladder. (See photos #17)

### Site

The site is secure and there is a fence that surrounds the entire facility.

Current US Dept. of Homeland security guidelines and NJ DEP guidelines suggest that all water tank sites be fenced and locked. “Tampering with this facility is a Federal Offense” signs be posted on and around the site. (See photo #41)

- **It is recommended to install additional signs on the fencing surrounding the tank.**
- **It is recommended to install a lock on the roof hatch cover.**
- **It is recommended to install a ladder gate on the lower access ladder.**

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## **SUMMARY AND RECOMMENDATIONS**

### **SUMMARY**

Overall this water storage tower is in good to fair condition. The exterior coating system should be removed and a new 3 part epoxy-urethane system applied within the next two years. The interior epoxy coating systems should be further evaluated, but could be replaced when the next exterior renovation is scheduled. In addition to the exterior and interior coating conditions, several modifications are recommended to bring this tank into current standards. The safety and sanitary issues are the most important.

### **RECOMMENDATIONS**

- **Within the next 2 years the tank should be fully contained, the exterior coating system should be removed by abrasive blast cleaning to a SSPC-SP6 Commercial Standard, and a new 3 coat epoxy-urethane system applied.**
- **The interior coating system should be evaluated further by performing a washout inspection to remove all sediment and determine the exact condition of the coatings. A new 3 coat epoxy lining system could be installed during the next exterior renovation cycle.**
- **Install a new aluminum or stainless steel ladder gate.**
- **Install new aluminum frost proof, vacuum pallet roof vent.**
- **Install new cable safety climb systems on all ladders.**
- **Install new 30" access manway on the tank riser.**
- **Repair all cracking and flaking concrete on foundation piers. Coat with epoxy to prevent further deterioration.**
- **Add signs to perimeter fencing to deter intrusion and vandalism.**

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# 1,000,000-Gallon Maryland Ave. Tank Atlantic City MUA, NJ

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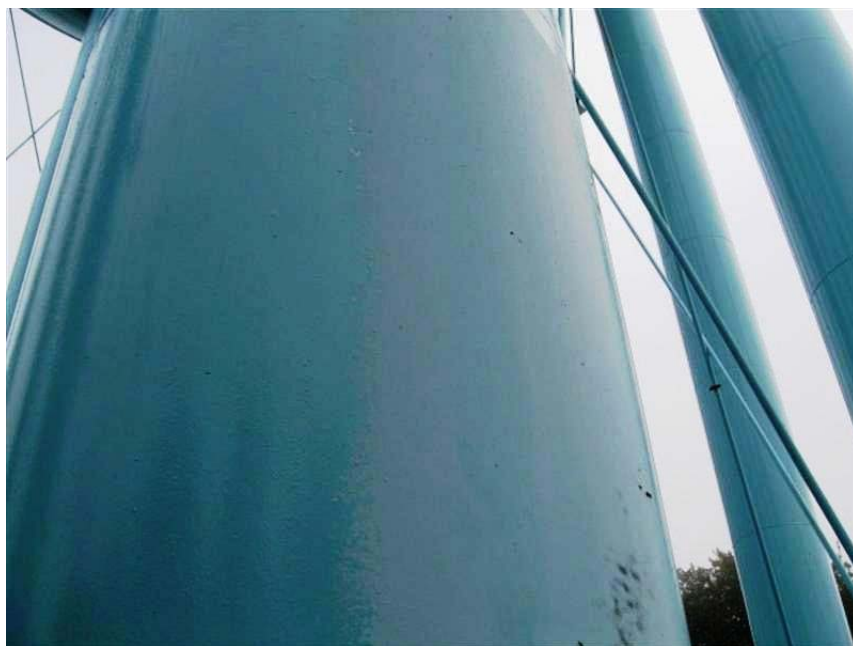




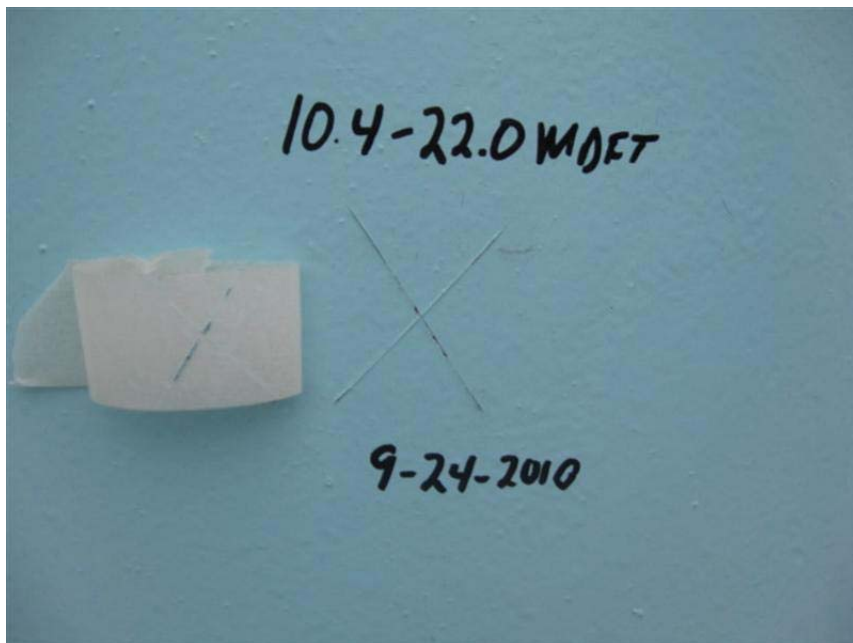
**Photo #1** Coatings on exterior legs are in good condition. Clear coat finish is beginning to delaminate.



**Photo #2** Coatings on tank riser pipe are in good to fair condition. Chalking and minor mildew growth is evident, along with delaminating clear coat.



**Photo #3** Coatings on exterior riser pipe and legs are in good to fair condition. Note that left side of the photo shows the clear coat finish and right side was skipped during the clear coat application.



**Photo #4** Adhesion is good with a dry film thickness of 10.4 to 22.0 mils. Due to presence of a clear coat finish on the exterior, the tank cannot be overcoated and the next renovation must include removal of the existing coating system.



**Photo #5** Corrosion and mildew growth on underside of tank bowl and on the structural beams.



**Photo #6** Corrosion and mildew growth on the underside of tank.



**Photo #7** Chalking of coating, and minor to moderate levels of corrosion on underside of tank bowl.



**Photo #8** Corrosion on the upper riser pipe.



**Photo #9** Coatings on sidewall are in good condition. Note delamination of clear coat finish along knuckle. (arrow)



**Photo #10** Coatings on sidewall are in good condition



**Photo #11** Mildew and staining on roof. Coatings are in generally good condition.



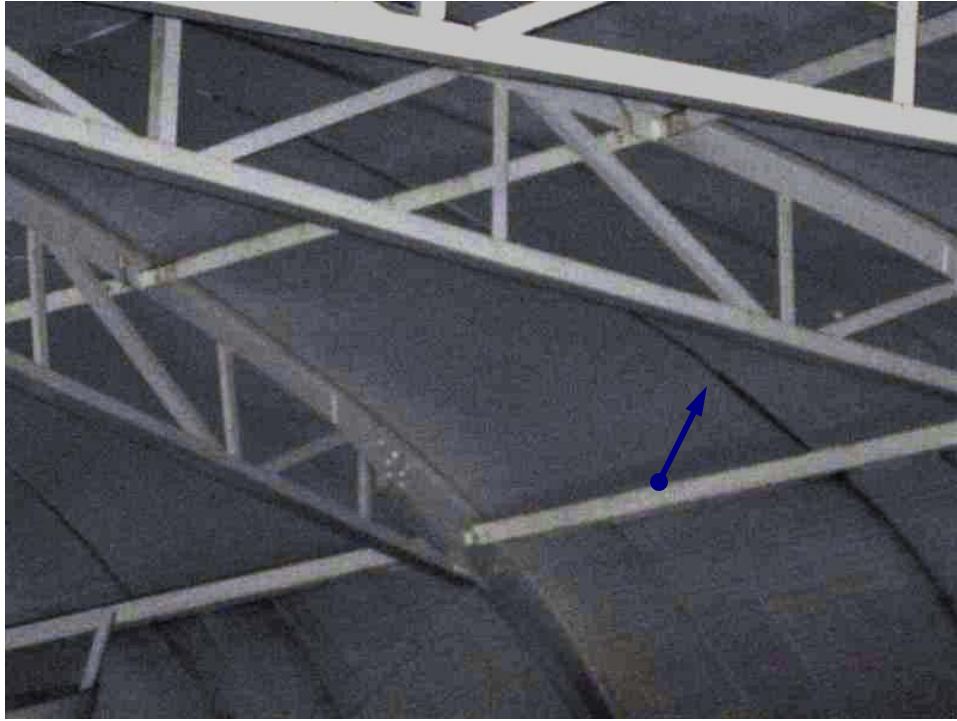
**Photo #12** Coatings on roof are thinning and clear coat finish is wearing and delaminating.



**Photo #13** Coatings on the interior are in good condition with some minor corrosion and organic staining on the sidewalls and roof.



**Photo #14** Coatings on interior roof and above the high water level are in fair condition. There is active corrosion and delamination on areas on structural beam edges.



**Photo #15** Minor corrosion on tank roof panels and weld seams.



**Photo #16** Coatings on roof structure and panels are in generally good condition.



**Photo #17** Main access ladder is in good condition, but does not contain a suitable safety climb device or a tamperproof ladder gate.



**Photo #18** Moderate levels of corrosion on the main access ladder cage.



**Photo #19** Areas of moderate corrosion on ladder balcony. Clear coat finish his delaminating on balcony floor.



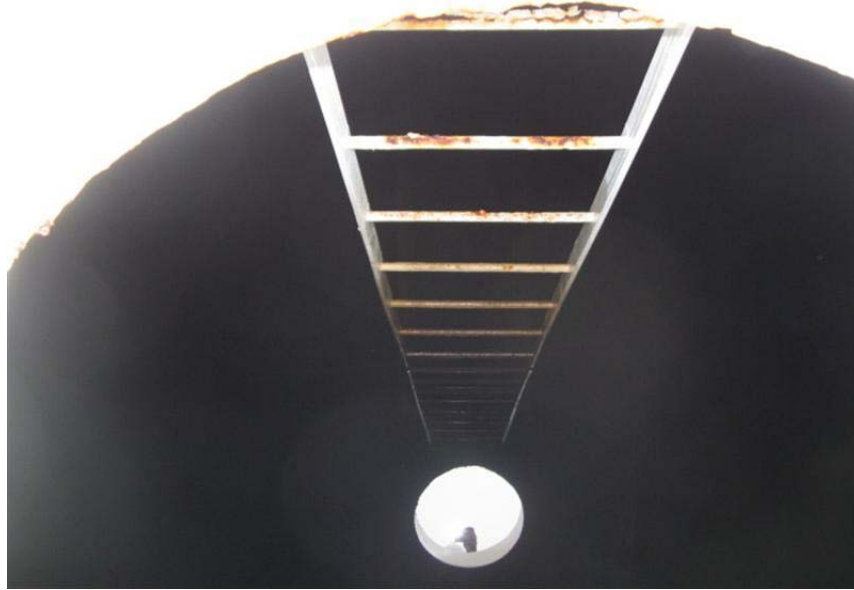
**Photo #20** Second tier access ladder does not contain a suitable safety climb device.



**Photo #21** Upper sidewall ladder is in good condition but does not contain a suitable safety climb device.



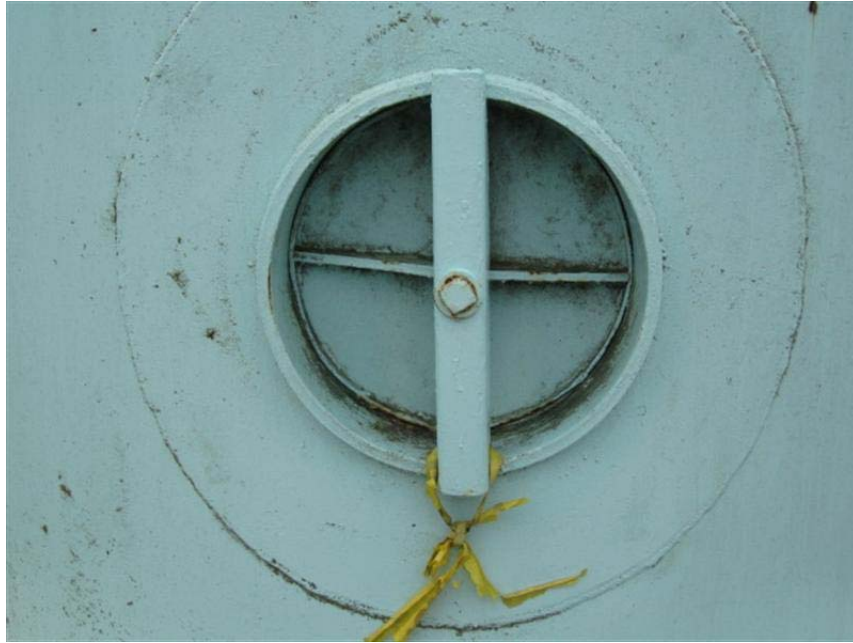
**Photo #22** Dome roof ladder is secure and in good condition, but does not contain a safety climb device.



**Photo #23** Interior ladder exhibits moderate levels of corrosion. There is no suitable safety climb device attached to this letter.



**Photo #24** Aviation warning like on the roof is not functioning. New battery-operated aviation flight has been attached to the roof vent. Photo also shows center roof vent.



**Photo #25** 24 inch riser manway is in good condition. Recommend installation of a new 30 inch bolted cover man way with davit arm on opposite side of riser pipe.



**Photo #26** Roof vent does not meet current standards and should be replaced with a modern aluminum frost proof that system to prevent insects and birds from entering the water chamber.



**Photo #27** 24" round roof access hatch. Roof hatch cover overlaps curb to prevent contaminated rainwater from entering the water chamber.



**Photo #28** Roof access hatch meets current standards and was not locked at the time of the inspection.



**Photo #29** Overflow pipe is secured to the leg and is in good condition



**Photo #30** Overflow terminates below grade and likely has an outlet in the adjacent street. Further investigation should be done to ensure a proper vent screen is in place to prevent vermin from entering the water chamber.



**Photo #31** Foundation piers are in good to fair condition. There are moderate levels of cracking and spalling on several of the foundation piers.



**Photo #32** Cracks should be filled and sealed to prevent the intrusion of water and possible freeze-thaw damage to the foundation.



**Photo #33**



**Photo #34** Cracking and spalling of concrete foundation piers



**Photo #35** Wind rods are tight and in good condition.



**Photo #36** Wind rod yokes and turnbuckles are in tight and in good condition.



**Photo #37**



**Photo #38** Anchor bolts and nuts are in generally good condition with only moderate levels of corrosion on several of the nuts.



**Photo #39** Approximately 6 anchor bolts and nuts exhibit severe levels of corrosion and should be replaced during the next renovation.



**Photo #40**



**Photo #41** Site is fenced and secure.



**Photo #42**