

DIXON

ENGINEERING AND
INSPECTION SERVICES
FOR THE COATING INDUSTRY

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Telephone 1-616-374/3221
Fax 1-616-374/7116

September 28, 2016

Town of Leesburg
25 W. Market St.
Leesburg, VA 20176

Attn: Russell Chambers

Re: 1,250,000 Gallon Equalization Basin A Storage Tank
Preliminary Maintenance Inspection

Dear Mr. Chambers:

Please find enclosed the above referenced report for the 1,250,000 gallon equalization basin A storage tank. The inspection was completed on August 17, 2016. The report consists of: 1) cover page; 2) conclusions and recommendations; 3) detailed report; 4) Field Inspection Report (FIR); 5) photographs and descriptions; and 6) flash drive.

Brief explanation: 1) The cover page is self-explanatory. 2) Conclusions and recommendations explain in short form what was found on the tank and what DIXON recommends for repair and maintenance of the tank. 3) This section is the long report that goes into detail to explain what exactly was found and why DIXON makes the recommendations. 4) Field Inspection Report (FIR) is the form that was completed when the inspection team was on-site and includes the dimensions and conditions of the tank. 5) Photographs and descriptions give the Owner a visual record of the condition of the tank and appurtenances. 6) Flash drive is an Adobe PDF format of the complete report and photos for your convenience.

If you have any questions or concerns, please call me at (330) 983-0062 ext. 402.

Thank you for choosing DIXON for your inspection needs.

FOR DIXON ENGINEERING, INC.,

Shannon Vidika
Project Manager

Enclosures

Members: Steel Structures Painting Council
American Water Works Association
Consulting Engineers Council

Dixon Engineering, Inc.

Preliminary Maintenance Inspection

1,250,000 Equalization Basin A

Leesburg, Virginia

Inspection Performed: August 17, 2016
Report Prepared: September 26, 2016
Reviewed by Ira M. Gabin, P.E.: September 27, 2016

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Dixon Engineering Inc.
815 W. Liberty St. , Suite 1, Medina, OH 44256

CONCLUSIONS:

1. The basin is below ground and consists of a concrete floor and sloped dirt walls.
2. The basin has a rubber liner on the walls, which is attached along the floor by aluminum strips and anchor bolts. Some of the bolts have come out of the floor. The liner is in fair condition with several rips and holes at the aluminum strips and at other random areas.
3. The concrete on the interior floor is in good condition. There are no signs of cracking or spalling.
4. One interior coating sample was taken and analyzed for metal content. Test results indicated that the coating is a lead bearing coating.

RECOMMENDATIONS:

1. Complete the recommended work in 1 to 2 years.
2. Install a new 45 mil thick rubber liner on the interior sloped dirt walls. Secure edges of the liner at the concrete floor with aluminum strips and anchor bolts. Liner seams on the slope should be heated and fused together with liquid sealant. Liner edges at the top of the walls should be buried. The estimated cost is \$50,000.
3. Abrasive blast clean to a commercial grade (SSPC-SP10) the steel catwalk beams, support structure, and piping. Apply an epoxy urethane system to steel surfaces above high water line and zinc epoxy system to steel surfaces below the high water line. The estimated cost is \$50,000.

COST SUMMARY:

Install a new rubber liner	\$50,000
Repaint Catwalk and Piping	<u>50,000</u>
Subtotal	\$100,000
Engineering and Contingencies	<u>\$20,000</u>
Total	\$120,000

Note: Better prices will be obtained if combined with another major project.

INSPECTION:

On August 17, 2016, Dixon Engineering, Inc., performed a preliminary maintenance inspection on the 1,250,000 gallon Equalization Basin A owned by the Town of Leesburg, Virginia. Purposes of the inspection were to evaluate the interior coatings and liner performance and life expectancy; assess the condition of concrete surfaces and the tank's appurtenances; review safety and health aspects; and make budgetary recommendations for continued maintenance of the tank. All recommendations, with budgeting estimates for repairs, are incorporated in this report. The inspection was performed by Lee Jamison, Project Manager. The inspector was assisted by John Watson and Dustin Houghton, Staff Technicians. Scheduling and arrangements for the inspection were completed through Russell Chambers.

TANK INFORMATION:

The tank was built in 1988 and is underground. The tank is 124 feet by 179 feet with 21 foot long sloped dirt walls that are covered with a rubber liner. The floor is poured in place. The catwalk and piping were last painted in 1988.

CONDITIONS AND RECOMMENDATIONS:

WET INTERIOR LINER CONDITIONS:

The interior has a rubber liner that covers the sidewalls and is in fair condition with numerous rips and other damage. The bottom edge of the liner is secured with aluminum strips and bolted into the concrete. There are a few of the bolts that are missing. The vertical seams of the liner have been heated and sealed together. The top edge of the liner has been buried. The liner is loose and sagging in many areas.

WET INTERIOR LINER RECOMMENDATIONS:

Install a new 45 mil thick rubber liner on the interior sloped dirt walls. Secure edges of the liner at the concrete floor with aluminum strips and anchor bolts. Liner seams on the slope should be heated and fused together with liquid sealant. Liner edges at the top of the walls should be buried. The estimated cost is \$50,000.

INTERIOR STRUCTURE CONDITIONS:

The floor is poured in-place concrete with cold joints. There are no signs of cracking or spalling. The catwalk platforms are supported by concrete columns that are in good condition with no significant cracking or spalling.

INTERIOR STRUCTURE RECOMMENDATIONS:

The interior floor has not deteriorated to the point of needing repairs.

SITE CONDITIONS:

The basin site is at the wastewater treatment plant with an average size staging area and is fenced.

METAL CONDITIONS:

Two catwalks run from the edge of the basin to the center and are constructed of steel beams and supports. The catwalks are in good condition but the coating is in poor condition with extensive scale corrosion on the support steel.

The piping in the interior runs along the catwalks to the center of the basin and extends down to the floor. The piping is in good condition but the coating is in fair condition. The pipes have general surface rust and delamination.

The coating was tested at 0.57 percent (5700 ppm) lead by weight, 0.47 percent (4700 ppm) chromium by weight. Special considerations will be needed during maintenance to avoid contamination of workers, and prevent generation of a hazardous waste.

METAL RECOMMENDATIONS:

Abrasive blast clean to a commercial grade (SSPC-SP6) the catwalks, support structures, and piping. Apply an epoxy urethane system to steel surfaces above high water line and zinc epoxy system to steel surfaces below the high water line. The estimated cost is \$50,000.

ANALYTICAL LABORATORY REPORT

Tuesday, August 30, 2016

Page 1 of 2

CUSTOMER: Dixon Engineering
1104 3rd Ave.
Lake Odessa, MI 48849

DATE RECEIVED: Thursday, August 25, 2016
PO/PROJECT #:
SUBMITTAL #: 2016-08-25-009

LAB NUMBER: AC18432

Sampled By: Dustin Houghton

Date Sampled:

Job Location: Leesburg, VA 1.25MM Basin A (West)

Sample Description: Paint Chips

Sample Identification: I: Leesburg, VA 1.25MM Basin A (West) - Catwalk

Preparation Method: EPA 3050B-P-M (Acid Digestion for Paints)

Analysis Method: EPA 6010C-M (ICP-AES Method for Determination of Metals)

Date Analyzed: Monday, August 29, 2016

<u>ELEMENT</u>	<u>RESULT (by dry weight)</u>	<u>REPORTING LIMIT (RL)</u>
Cadmium	< RL	0.00075 %
Chromium	0.47 %	0.0013 %
Lead	0.57 %	0.0025 %

CCC&L has obtained accreditation under the programs detailed on the final page of the laboratory report. The accreditations pertain only to the testing performed for the elements, and in accordance with the test methods, listed in the scope of accreditation table. Testing which is performed by CCC&L according to other test methods, or for elements which are not included in the table fall outside of the current scope of laboratory accreditation.

This report shall not be reproduced except in full, without written approval of CCC&L.

DIXON ENGINEERING, INC.
CONCRETE TANK FIELD INSPECTION REPORT

DATE: August 17, 2016

OWNER: Town of Leesburg

CLIENT CODE: 46-55-01-37

TANK NAME: Basin A (West)

LOCATION: Street: 1391 E. Market St.

City: Leesburg

State: Virginia

TANK SIZE: Capacity: 1,250,000 gallons

Length: 179 feet Width: 124 feet (measured)

Height to overflow (HWL): 19 feet

Sidewall Height: 21 feet

CONSTRUCTION: Cast in Place

Tank Layout: Below grade

DATE CONSTRUCTED: 1988

MANUFACTURER: Unknown

CONTRACT NUMBER: Unknown

COATING HISTORY:	EXTERIOR Piping/Catwalk	WET INTERIOR Rubber liner
DATE LAST COATED	<u>1988</u>	<u>1988 (Installed)</u>
CONTRACTOR	<u>Unknown</u>	<u>Unknown</u>
PAINT SYSTEM	<u>Unknown</u>	<u>Unknown</u>
SURFACE PREPARATION	<u>Unknown</u>	<u>Unknown</u>
PAINT MANUFACTURER	<u>Unknown</u>	<u>Unknown</u>
PAINT SAMPLES	<u>Yes</u>	<u>N/A</u>
HEAVY METAL COATING	<u>Yes Lead 0.57%</u>	

PERSONNEL: Inspector John Watson, Top person Lee Jamison,

Ground person Dustin Houghton

TYPE OF INSPECTION: Preliminary Maintenance

METHOD OF INSPECTION: Dry

DATE LAST INSPECTED: Unknown

SITE CONDITIONS:

Fenced: Yes
Control building: Yes
Location: Adjacent to tank
Site conditions: Well maintained
Neighborhood: Wastewater Treatment Plant
Shrub, tree, etc. encroachment: No
Site Comments: Inside WWTP property

EXPOSED PIPING:

Location: Adjacent to tank
Condition of pipe coating: Poor
Describe coating: Delaminating, spot coating failures to substrate, rust bleedthrough, and rust undercutting
Condition of metal: Good
Piping comments: Piping is above basin along catwalk to center of basin

FOUNDATION:

Foundation exposed: No
Separate foundation: Not visible
Indications of settlement: No
Surface drainage: Away from foundation
Footing drains: Unknown
Indications of underground leakage: No
Undermining of tank: No

CRACK GRADES

Crack Grade	Width
1	Tight, no separation - dormant
2	Tight to up to fingernail width
3	Fingernail width up to 1/8 inch
4	1/8 up to 1/4 inch
5	Greater than 1/4 inch

EXTERIOR:

SIDEWALL:

Not exposed

EXTERIOR APPURTENANCES:

Overflow pipe:

Inside diameter: 12 inches

Coating condition: N/A

Metal condition: Good

Condition of screen: None present

Flap gate: No

Air gap: No

Splash pad: No

Overflow comments: 2 overflows; 1 on southeast corner connecting basins; 2nd on south wall, funnel shaped

Sidewall manway:

N/A

Exterior ladder:

N/A

Ventilation:

N/A

Vent comments: Open top of basin; no roof

CRACK GRADES

Crack Grade	Width
1	Tight, no separation - dormant
2	Tight to up to fingernail width
3	Fingernail width up to 1/8 inch
4	1/8 up to 1/4 inch
5	Greater than 1/4 inch

WET INTERIOR:

Tank Sidewall:

Concrete condition: Dirt sidewall covered by rubber liner

Liner Present: Yes

Location: Entire sidewall

WET INTERIOR:

Type of coating: **Rubber liner**

Coating condition: **Fair**

Describe coating: **Random rips and tears top 2-3 feet of liner above high water line; previously patched liner tearing around foundations for catwalk**

Cracking (interior sidewall):

Number of cracks: **4-5**

Total length of cracking: **4-5 feet**

Crack Descriptions:

Location: **Top 2-3 feet above high water line (patched)**

Grade: **4**

Length: **3-4 feet**

Orientation: **Vertical**

Location: **Around concrete foundations for catwalks**

Grade: **4**

Length: **2-3 feet**

Interior Sidewall comments: **Liner 45 mils thick**

Tank floor:

Concrete condition: **Good**

Rusting at surface: **No**

Coating Present: **No**

Interior Floor comments: **Tank floor dimensions 52 x 103 feet; 2 sump pits 21 foot x 21 foot x 30 inch diameter joined by 30 feet long by 22 inch wide by 30 inch deep channel**

Wall to Floor Junction:

Floor to wall separation: **No**

Curb present: **Yes**

Size: **6 inches x 103 feet**

Curb sealed: **Yes**

Describe sealing material: **Rubber lining**

Wall to floor junction comments: **Two bolts missing**

Sediment and Sump:

Sediment depth: **> ½ inch**

Sediment distribution: **Uniform**

WET INTERIOR:

Could sediment distribution indicate a leak: **No**

Sump present: **Yes**

Size: **21 feet x 21 feet x 30 inches**

This sump is used for: **Pumps**

WET INTERIOR ACCESSORIES:

Tank ladder:

N/A

Fill pipe: (2)

Diameter: **8 inches**

Height above floor: **42 inches**

Configuration: **Stubs at wall**

One way valves present: **No**

Deflector on end: **Yes**

Removable silt ring: **No**

Mixing system: **Yes**

Type: **Power mixer**

Coating condition: **Not coated**

Metal condition: **Good**

Separate draw pipe:

Diameter: **12 inches**

Height above floor: **12 inches**

Deflector over end: **No**

Removable silt ring: **No**

Coating condition: **Poor**

Metal condition: **Good**

Overflow: (2)

Type of inlet: **Funnel and straight pipe**

Condition: **Good**

Coating condition: **Not coated**

Overflow comments: **Two overflows; one funnel on south wall and one straight pipe between basins on southeast corner**

Roof Beams:

N/A

WET INTERIOR ACCESSORIES:

Columns: (Catwalk)

Number: 16

Dimensions: 24 inch diameter and 21 foot height

Shape: Round

Condition: Good

Base flare: No

Roof flare: No

Columns: (Fill pipe)

Number: 1

Dimensions: 16 inch diameter- 3 feet high

Shape: Round

Condition: Good

Base flare: No

Roof flare: No

Baffle walls:

N/A

Roof penetrations:

N/A

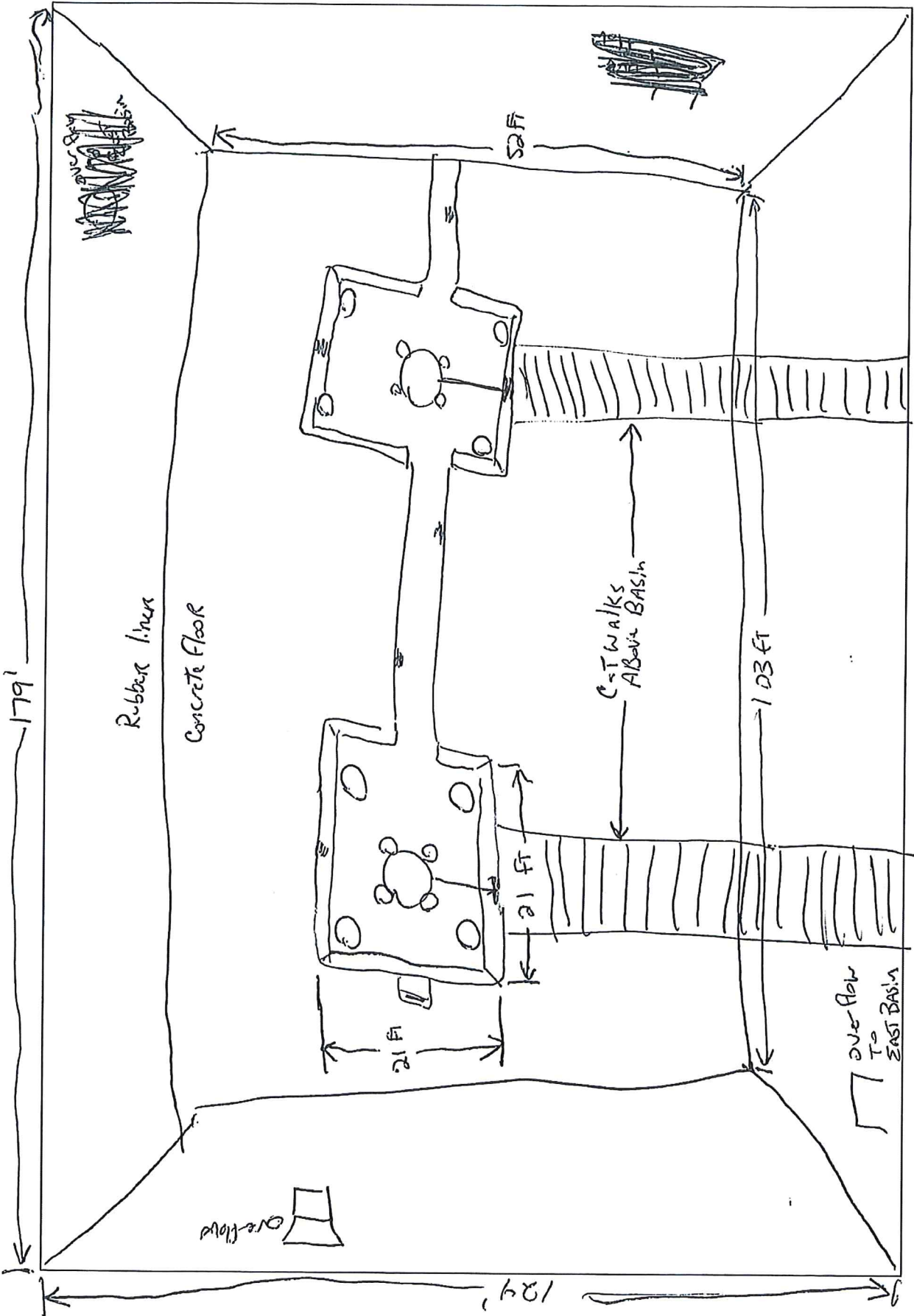
Sidewall penetrations:

Number: 3

Purpose: Overflow piping

Condition: Good

Field Inspection Report is prepared from the contractor's viewpoint. It contains most of the information the contractor needs to prepare his bid for any repairs or repainting. The Engineer uses it to prepare the engineering report. Cost estimates are more accurate if contractor problems can be anticipated. While prepared from the contractor's viewpoint, the only intended beneficiary is the owner. These reports are completed with diligence, but the accuracy is not guaranteed. The contractor is still advised to visit the site.



~~EXTENSIBLE~~
ladders, overflow pipes etc.)

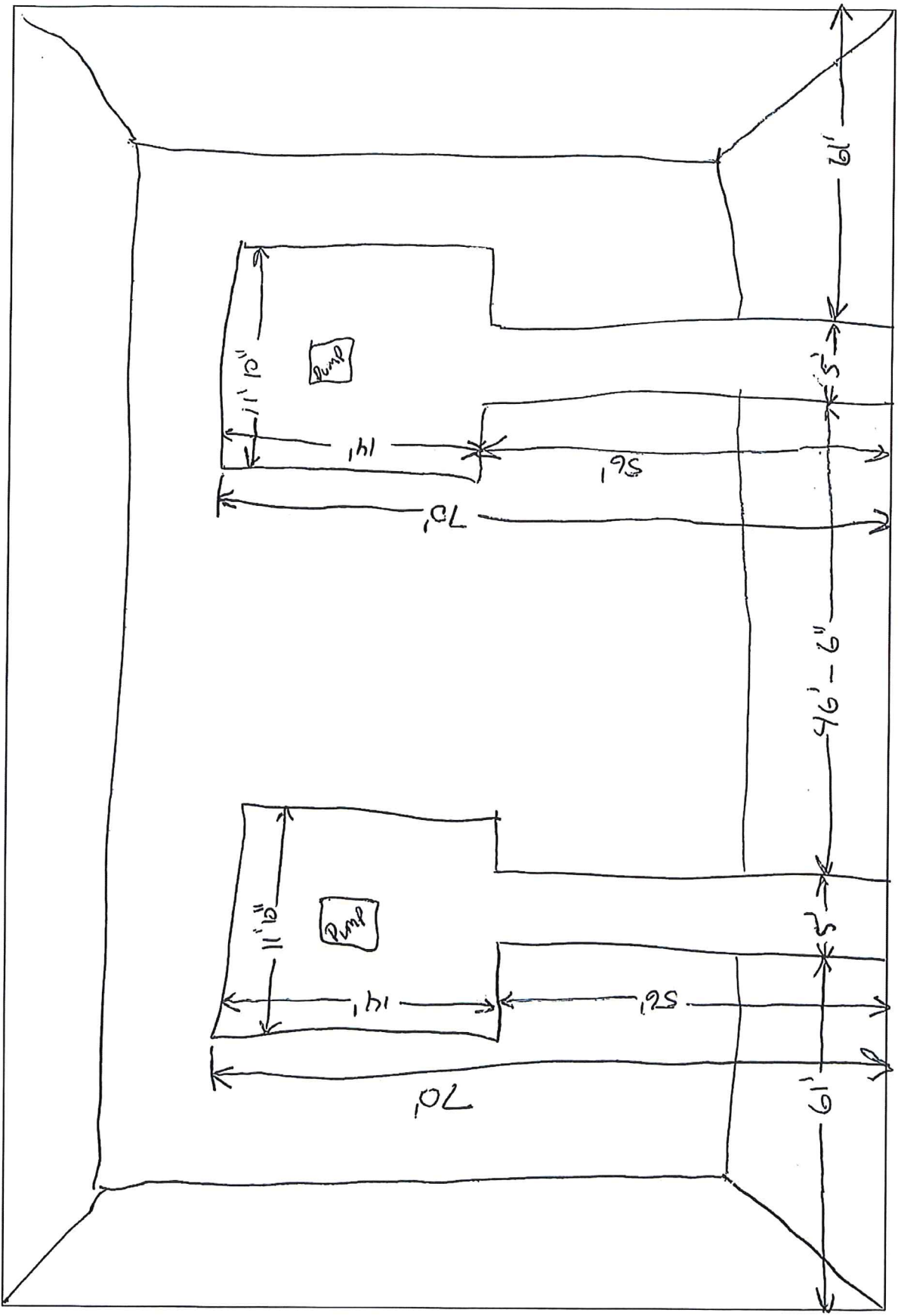
SECTION: Sketch cracking (label side if rectangle shaped, label quadrant if round, sketch markers such as manways,



~~EXTERNAL WALL~~
ladders, overflow pipes etc.)

MANWAYS

SECTION: Sketch cracking (label side if rectangle shaped, label quadrant if round, sketch markers such as manways,



Basin A West



1) Rubber liner on dirt sloped walls.

2) Same.



3) Same.

Basin A West



4) Pipe penetrations in wall liner.



5) Same.

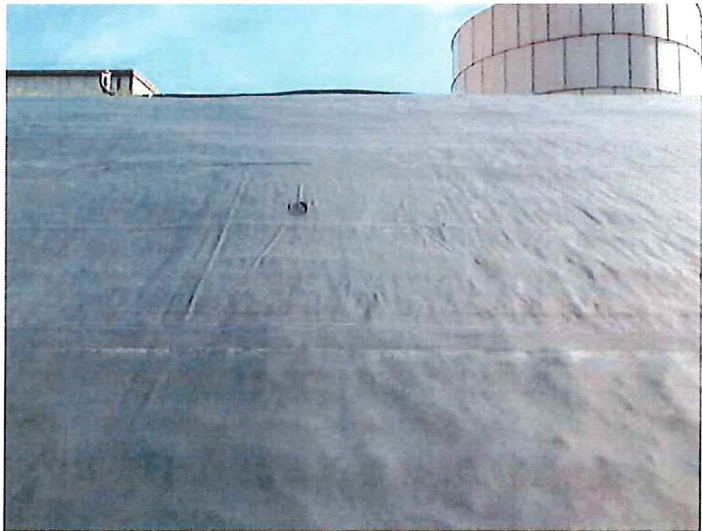


6) Liner secured with aluminum strips and bolts at concrete floor.

Basin A West



7) Liner is tearing at bolted strips.



8) Random holes found in liner.



9) Liner is loose and sagging in many areas.

Basin A West



10) The concrete floor is in good condition.

11) Same.



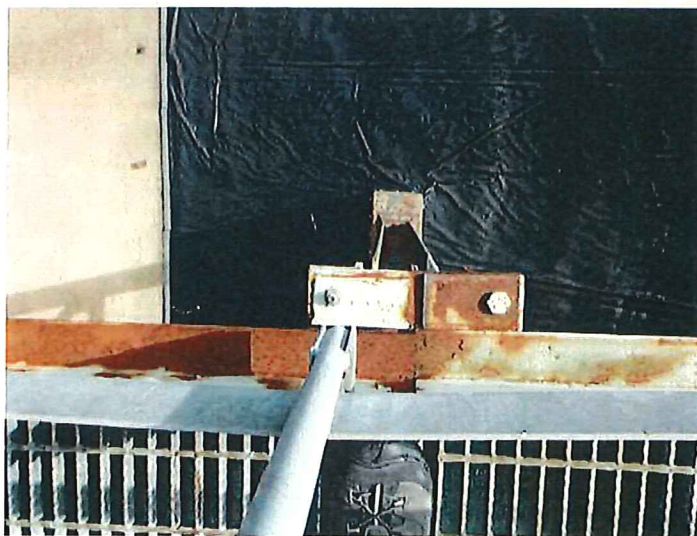
12) Same.

Basin A West



13) Catwalk starts at top edge of basin and extends to center of tank.

14) The coating on the catwalk is in poor condition.



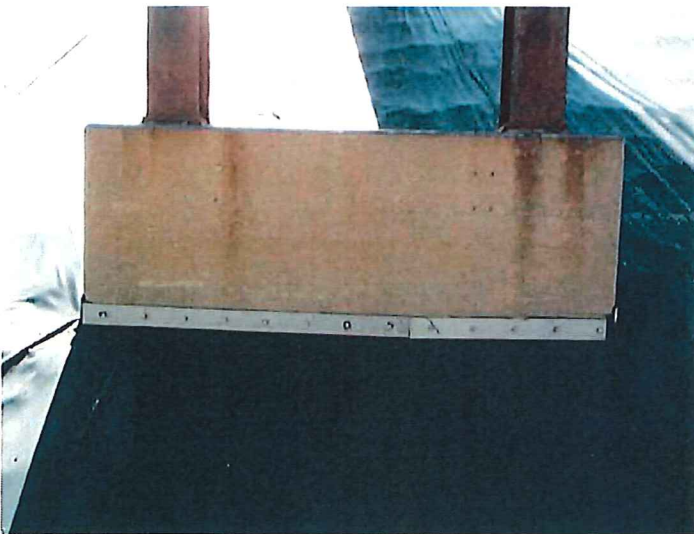
15) Same.

Basin A West



16) Same.

17) Catwalk supports have general surface rusting.



18) Same.

Basin A West



19) Piping is attached to underside of catwalk. Coating is in fair condition with rusting at fittings.

20) Same.



21) Same.