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July 9, 2010

Ref. No. 5509123.101.710

Mr. Terry Dan DeCraene, Wastewater Contracts Supervisor
City of Winnipeg, Water & Waste Department
2230 Main Street
Winnipeg MB R2V 4T8

Dear Mr. DeCraene:

Re: NEWPCC Digester Number 11 – Roof Underside and Wall Interior Condition Assessment

As a follow up to the inspection work that was completed in January, 2010 MMM Group Limited (MMM) performed a visual condition assessment of the interior of Digester 11 at the North End Water Pollution Control Centre (NEWPCC) with focus on the cast-in-place two way concrete roof slab bottom surface and walls. This work was initiated in response to an over pressurization of the digester last fall.

We understand that this inspection completes the first of a three phase approach to the recommissioning of digester 11 into active service. These phases are:

- Phase 1: Condition Assessment
- Phase 2: Design of Rehabilitation
- Phase 3: Reconstruction/Strengthening

At this stage, MMM have been retained for Phase 1 only.

This report is to be read in conjunction with the MMM Condition Assessment of Roof report dated February 1, 2010.

Observations

MMM visited the site the morning of Monday, June 21 and had the following observations:

- A light coloured band approximately 3m in height was visible along the entire interior surface of the wall. MMM was told this band indicated the range between the lowest and highest levels of effluent in the distiller.
- The interior surface of the circular wall had four (4) horizontal cracks 1 to 2mm in width along the North half of the tank. The lowest crack was at approximately 4.9m from the top of the floor slab and the other cracks were spaced at 1m intervals above.
- Cracks were visible on the underside of the roof slab. Crack width measurements were not possible as the ladder provided was not high enough.
- Minor cracks were visible on some of the column capitals.

Discussion

By comparing the cracks observed previously on the top of the roof with those observed from below the roof, it is apparent that many cracks penetrate completely through the slab (see attached crack map sketch). Differences in elevation across a crack were also observed from below the roof slab that mirror those previously observed from above. See Photos 1 and 2 below. This is concerning in that it indicates a failure of the reinforcing steel in this plane.

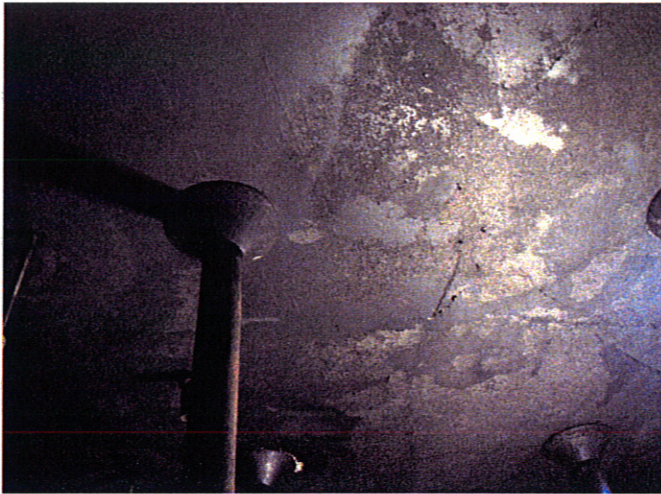


Photo 1: Cracks on underside of roof slab.

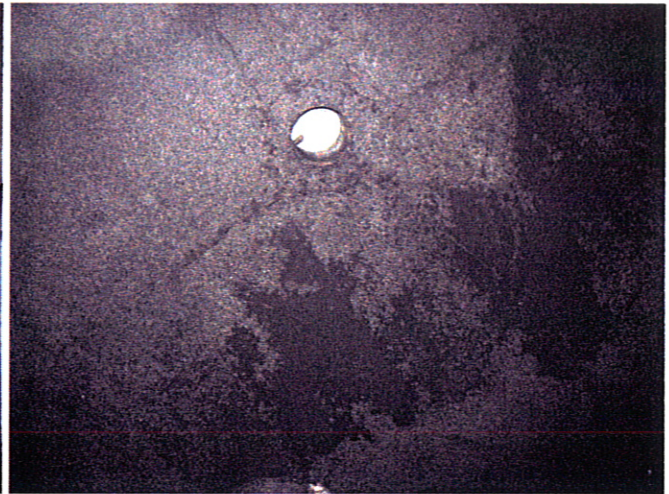


Photo 2: Cracks in roof slab around opening.

The horizontal cracks on the interior wall of the distiller appear to be old (See Photo 3). Areas of roof membrane and effluent residue are loose with some pieces having fallen to the floor below. The sizes of these pieces are as large as one square foot and up to one inch thick. MMM was informed that the roof pieces fell as a result of pressure washing the bottom of the roof slab. The fallen pieces are all located in patches around the column capitals. Several of the column capitals have minor vertical cracks on the surface. There was no visible damage to any of the columns. See Photo 4.

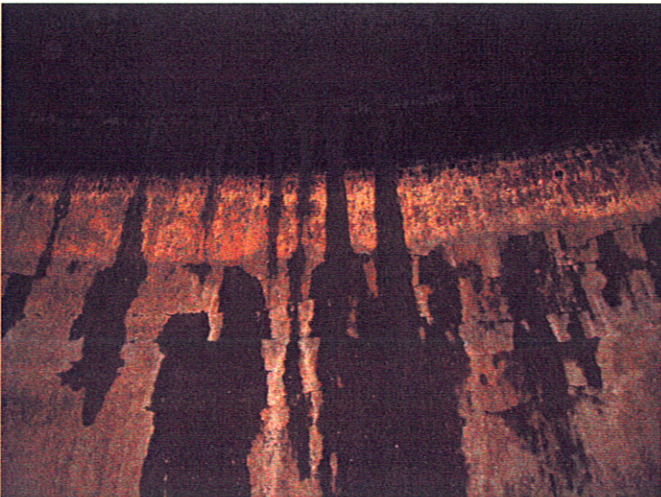


Photo 3: Horizontal cracks on interior wall.



Photo 4: Fallen pieces of roof material around column capitals.

A result of the roof membrane having been raised 0.9 to 1.2m in the centre of the digester, damage to some of the interior equipment that is connected to the roof was observed. See Photo 5.

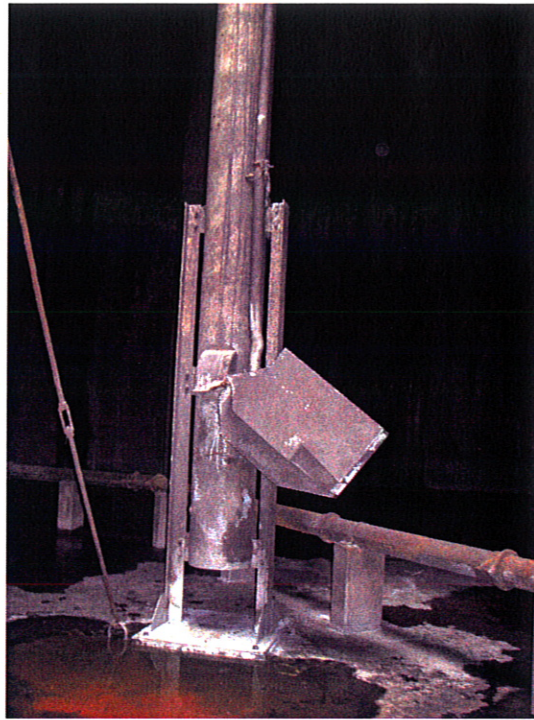


Photo 5: Damaged internal equipment.

Conclusions and Recommendations

The following conclusions and recommendations are based on visual inspection only of the top and bottom surfaces of the roof, the interior face of the walls, and the supporting columns. There have been no material testing performed on the concrete to determine its strength, nor has the condition of the reinforcing steel been determined. Based upon the observed cracking and the differential movement of the roof slab, we suspect that the steel reinforcement has sheared, deformed or has lost bond with the concrete.

It is our opinion that the roof slab has failed along a middle strip roughly concentric about the centre of the digester.

The cracks in the interior wall of the digester and column capitals should be filled and sealed to ensure water-tightness of the tank. The soundness of the concrete in the column capitals should be tested by sound hammering to determine the extent of damage prior to repair of the roof.


Given the observed condition of the digester roof, we recommend that the roof be replaced or strengthened depending on the results of the next phase of work (design).

We believe that currently it is safe to enter the interior of the digester as long as the roof is not loaded with snow or other buildup. This is based on the fact that the roof previously supported a uniform load of snow, concrete pavers, membrane and concrete insulation. With time and exposure, the condition of the roof may degrade, so it is recommended that the next phase of the work proceed as soon as possible.

If you have any questions or comments, please call me at 943-3178.

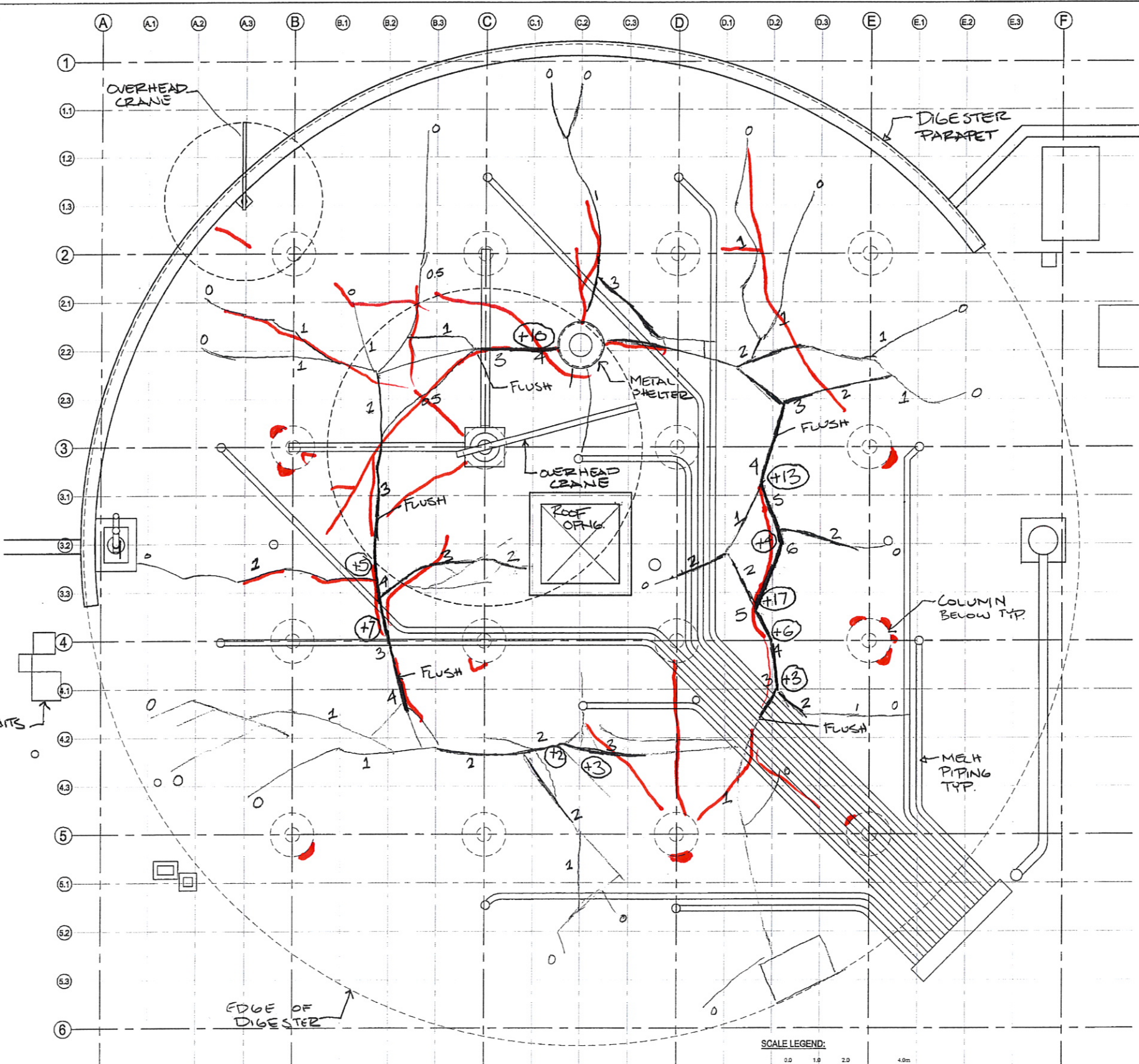
Yours truly,

MMM Group Limited



Edmund Ho, P. Eng.
Project Engineer, Bridges and Structures

EH/dt
5509123 100709 NEWPCC Dig 11 Internal Condition Assessment - jpl draft



- LEGEND**
- CRACK (TOP OF SLAB)
 - 3 - CRACK WIDTH
 - +5 - CRACK TRANSCATION
 - CRACK (BOTTOM OF SLAB)
 - FALLEN ROOF PIECES AROUND COLUMN CAPITAL

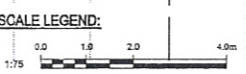
FOR INFORMATION PURPOSES ONLY
 JANUARY 25, 2010

DIGESTER #11- ROOF SURFACE CRACK MAP

OBSERVED ON JANUARY 22/2010
 BY CARLIN LETREMAN (MMMG) (A/B/C)

A = DETAIL/SECTION No.
 B = DRAWING WHERE SHOWN
 C = DRAWING WHERE TAKEN

METRIC
 WHOLE NUMBERS INDICATE MILLIMETRES
 DECIMALIZED NUMBERS INDICATE METRES



No.	DESIGNED BY	CUL		
	DRAWN BY	CUL		
	HOR. SCALE	AS NOTED		
	VERT. SCALE	AS NOTED		
REVISIONS	DATE	BY	DATE	10.01.20
	DATE		DATE	10.01.20

ENGINEER'S SEAL

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THE CITY OF WINNIPEG
 WASTE AND WATER DEPARTMENT

NORTH END POLLUTION CONTROL CENTRE
DIGESTER #11
 ROOF REPAIR
 ROOF PLAN - JANUARY 25, 2010

CONSULTANT DRAWING No.: 5509123-C-01
 SHEET 1 OF 1
 CITY DRAWING No.: -
 BID OPPORTUNITY: -
 PLOT DATE: -

Last saved January 20, 2010 - 10:26 AM by LETREMAN
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