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Technical Memorandum

TO: Brian M. Kelly, Acting Chief, Region V United States Environmental Protection Agency
FROM: Bryan Mullins, LATA-KEMRON Remediation, LLC.
SUBJECT: Proposed Path Forward at the Chevy in the Hole Site – Parcel A, Flint, Michigan
DATE: November 7, 2011

INTRODUCTION

The following technical memorandum describes the general proposed path forward for the Chevy in the Hole Site in Flint, Michigan based on site investigation activities conducted by LATA-KEMRON Remediation, LLC. (LKR) from October 17 through October 24, 2011. Following receipt and evaluation of data collected during the site investigation, LKR will prepare and submit a site investigation report. The information contained in this technical memorandum will be included in the report. The proposed work described below is primarily based on observations noted during inspection of the floodwall and outfalls present on-site and conversations with City of Flint personnel regarding the use of on-site utilities. The proposed work described below would comprise the first phase of the proposed removal action as described in Section 1.3 of the *Site Investigation Work Plan for Chevy in the Hole Site – Parcel A, Flint, Michigan dated September 2011*.

This proposed phase of the Chevy in the Hole removal action is intended to address oily sheen present on the Flint River via the following means:

- Deployment and maintenance of booms in the Flint River;
- Removal of inactive storm sewer and drainage lines associated with the previous plant that provide potential non-aqueous phase liquid (NAPL) migration pathways to the river;
- Replacement of active and likely compromised utility lines that have been observed to leak oily sheen into the river;
- Sealing of all compromised floodwall construction joints;
- Replacement of flap valves associated with floodwall pressure relief to minimize flushing through cracks and joints;
- Possible installation of new groundwater relief pipe routed to the City sanitary sewer system;

- Implementation of a storm water management plan to minimize infiltration; and
- Monthly or quarterly outfall monitoring events to observe if sheen is present on the river or walls following completion of Phase I, and if so, where the sheen is emanating from along the floodwall. Additionally, groundwater and product level elevation readings will be collected to assess the impact of sealing pathways to the river.

OUTFALL INSPECTION SUMMARY

A total of nine outfalls are located along the floodwall adjacent to Parcel A (Outfalls #65 through #73). Each outfall and associated storm sewer piping were inspected during the October 2011 Site Investigation. The following table provides a summary of the proposed actions for each outfall. The following sections provide usage, construction details, historic observations, current observations, proposed actions, and photographs for each outfall.

Table 1. Summary of Proposed Actions for Parcel A Outfalls

Outfall	Use	Proposed Action
#65	Active Outfall – Chevrolet Avenue	No action. Leave in place.
#66	Inactive	Excavate and remove.
#67	Inactive	Excavate and remove.
#68	Active Outfall – Garden Street	Excavate and replace.
#69	Inactive	Excavate and remove.
#70	Bypass from Sanitary Sewer Vault	To be decided following further City investigation.
#71	Inactive	Excavate and remove.
#72	Inactive	Excavate and remove. Possibly convert to surface water outlet.
#73	Active Outfall – Pershing Street	No action. Leave in Place.

Outfall #65:

Use: Active City Storm Water Outfall – Chevrolet Avenue

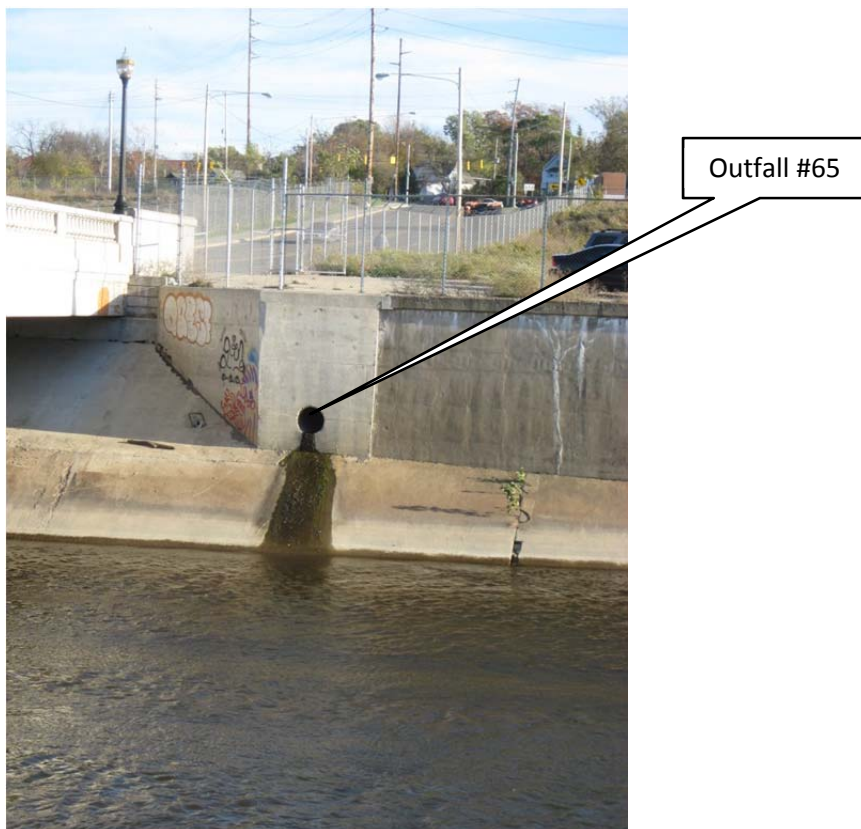
Construction Details: 18” concrete pipe Invert Elevation (I.E.) = 694.59 feet above mean sea level (ft AMSL)

Historical Observations: No sheen historically observed on the Flint River. Dye test conducted by City in June/July 2011 indicate outfall is active and drains storm sewer along Chevrolet Avenue.

Current Observations: No sheen, staining, or fluorescence observed on the Flint River during site investigation. No booms/socks in river. Flow observed from outfall during rainy conditions.

Proposed Action: No action. Leave in place.

Outfall #65 Photos:



Outfall #66:

Use: Inactive Storm Drain for the old plant

Construction Details: 12" metal pipe I.E. = 695.09 ft AMSL

Historical Observations: No sheen historically observed on the Flint River.

Current Observations: No sheen observed on the Flint River during site investigation. No booms/socks in river. Opened two manholes associated with Outfall #66. Manhole directly adjacent to floodwall was dry. Manhole south of floodwall appeared to be a sump for the previous plant. Oily sheen present in the bottom of the sump as well as an absorbent sock. Absorbent sock fluoresced blue under ultra violet (UV) light. No off-site, active utilities appear to be routed to Outfall #66.

Proposed Action: Excavate and remove. Fill in excavation with compacted clay and plug hole with adobe bricks, hydraulic cement, and mortar facing.

Photos:



Outfall #66 Photos (continued):



Manhole south of
floodwall (sump)

Oily sheen

Absorbent Sock



Manhole south of
floodwall (sump)

Absorbent Sock
fluorescing under
UV spotlight

Outfall #67:

Use: Inactive Storm Drain for the old plant

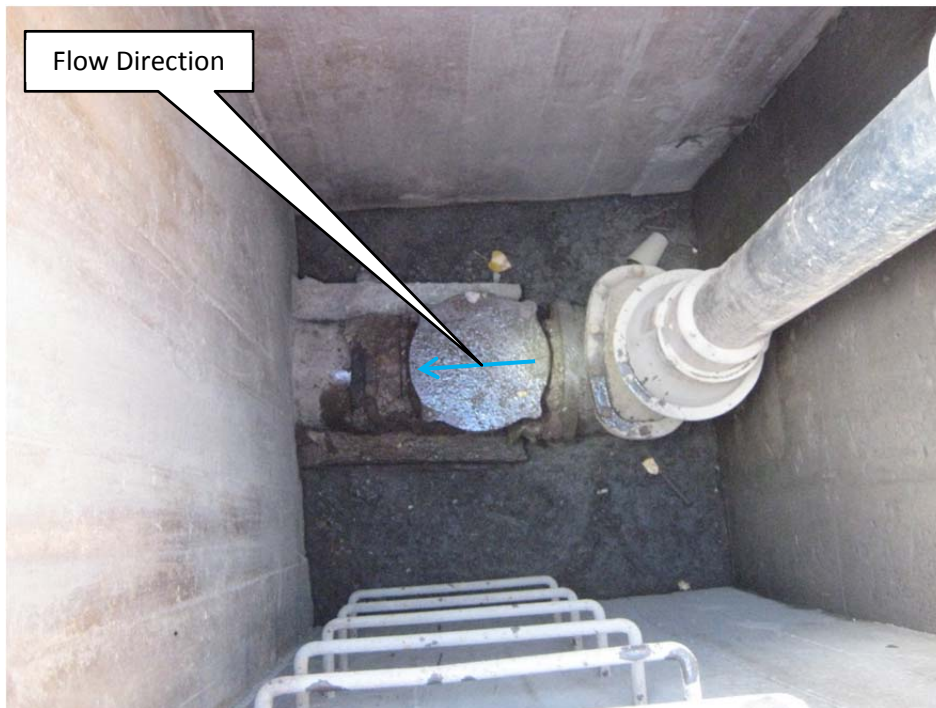
Construction Details: 10" metal pipe I.E. = 694.43 ft AMSL

Historical Observations: No sheen historically observed on the Flint River.

Current Observations: No sheen observed on the Flint River during site investigation. No booms/socks in river. Opened manhole for Outfall #67. Dry. No UV fluorescence.

Proposed Action: Excavate and remove. Fill in excavation with compacted clay and plug hole with adobe bricks, hydraulic cement, and mortar facing.

Photos:



Flow Direction

Manhole directly adjacent to floodwall

Outfall #68:

Use: Active City Storm water Outfall – Garden Street

Construction Details: 12" clay pipe I.E. = 694.31 ft AMSL

Historical Observations: Occasional sheen observed on the Flint River. Dye test conducted by City in June/July 2011 indicate outfall is active and drains storm sewer along Garden Street. Dye test also indicated that the pipe may be compromised – the dye took a relatively long time to reach the outfall and the clay pipe appears cracked when looking in from the outfall side.

Current Observations: No sheen observed on the Flint River during site investigation. Staining on the floodwall and fluorescence on the floodwall and piping were observed during inspection. Booms/socks present in the river adjacent to the outfall. High flow from outfall not seen during rainy conditions, indicating either minimal flow and/or compromised pipeline. Catch basin located off-site south of Garden Street observed during rainy conditions – surface water flow off of Garden Street appears to mainly infiltrate into grassy area before the catch basin. Gallon jug of what appeared to be used oil found near off-site catch basin. City employee reported the inlet area was formerly used as a residential dumping area, thereby increasing likelihood of oil dumping into the inlet. Opened manhole for Garden Street Storm Sewer immediately south of the outfall. No UV fluorescence observed.

Proposed Action: Inquire with City to either abandon this pipeline or reroute storm water to another outfall, so that it can be removed at wall. Otherwise, excavate and replace compromised piping that runs through the NAPL plume.

Photos:



Outfall #68 Photos (continued):



UV fluorescence
on outfall piping

Outfall #68 Photos (continued):



UV fluorescence on
wall below outfall



Off-site catch basin for
Garden Street Storm
Sewer located in
grassy overgrowth; jug
of spent motor oil
found nearby.

Outfall #69:

Use: Inactive Storm Drain for the old plant

Construction Details: 8" metal pipe I.E. = 696.10 ft AMSL

Historical Observations: No sheen historically observed from outfall.

Current Observations: No sheen observed from outfall during site investigation. No staining or UV fluorescence noted during inspection.

Proposed Action: Excavate and remove. Fill in excavation with compacted clay and plug hole with adobe bricks, hydraulic cement, and mortar facing.

Photos:



Outfall #70:

Use: Bypass (Overflow) for sanitary sewer vault located on-site

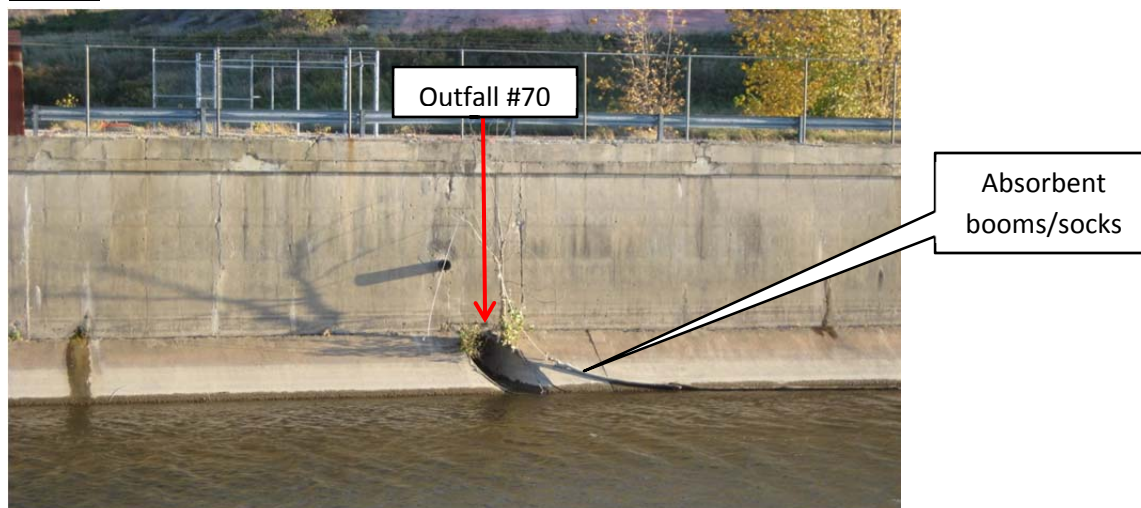
Construction Details: 48" cast iron pipe I.E. = 686.98 ft AMSL (lowest outfall along wall)

Historical Observations: Sheen historically observed on a regular basis.

Current Observations: Sheen observed coming from outfall every day of the site investigation. The outfall was 2/3 filled with sediment. Remnants of a sand bag were present at the outfall entrance into the river. Any weight on sandbag and sediments caused sheen to emanate from the outfall. UV spotlight shown into outfall lit up a path of light blue fluorescence noted from the entrance to the farthest visible extent. Digging into the sediment showed contamination throughout the depth. Staining on the walls of the piping also fluoresced a light blue. Booms are located near Outfall #70, but do not absorb a majority of the sheen that flows from the outfall. The City opened the slab of the sanitary sewer vault but could not see the bypass valve for the outfall pipe (possibly underwater). City does not have records of opening bypass valve since installed in 1925. Other than one fluorescing rag, no UV fluorescence observed within the vault. A smoke test of the vault did not result in smoke exiting at any outfalls, including #70 (although smoke test did confirm above-ground vents are connected). Information and tests seem to indicate that the bypass pipe valve is closed and that NAPL is leaking into the pipe at a location between the vault and outfall. Storm water ponding (and subsequent infiltration) in this area likely contributes to NAPL sheen near the vault because the valve is believed to be shut and the lowest groundwater elevation occurs near the vault. City personnel have indicated that they are planning to jet the pipe out and investigate the integrity of the pipe using photos and video.

Proposed Action: To be decided following further investigation by the City. Possible abandonment or repair/replacement depending on the results of the City investigation. Remove vegetation at outfall. Recommend test pit to look for compromised joint or pipe; seal as required. Test pit to include some soil removal/exploratory excavation adjacent to and west of the sanitary sewer vault.

Photos:



Outfall #70 Photos (continued):

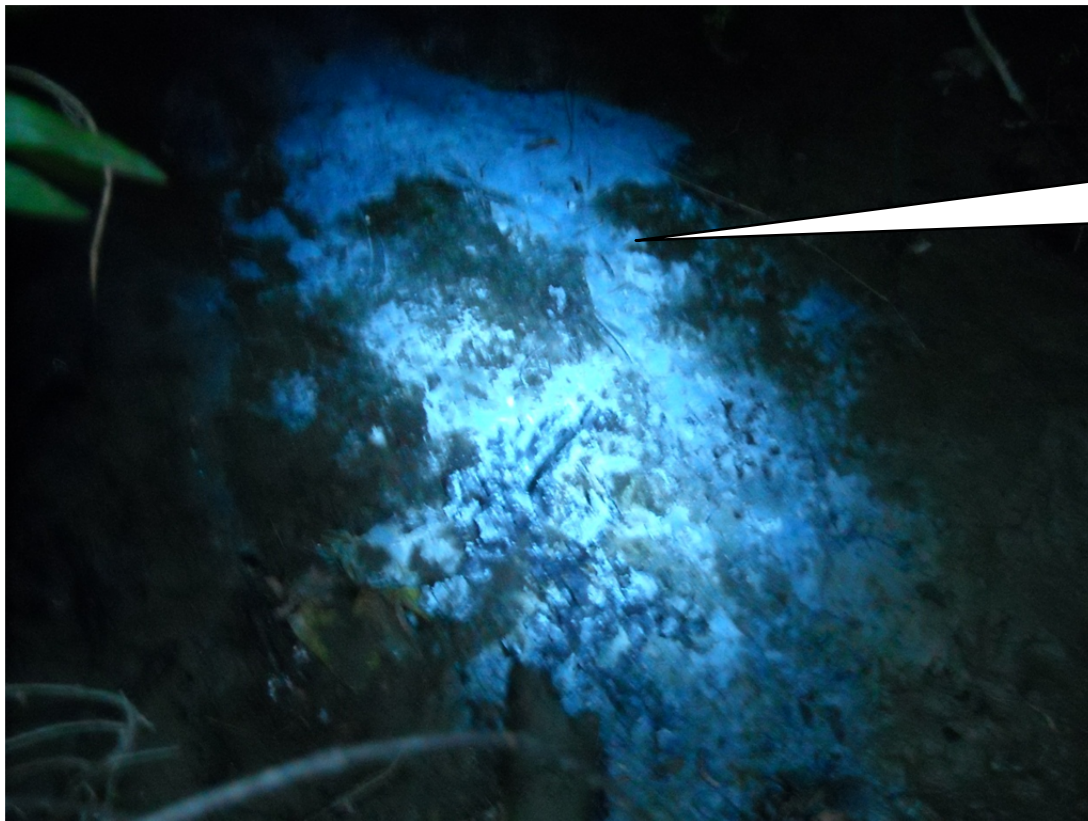


Sheen emanating
from Outfall #70



Sheen emanating
from Outfall #70

Outfall #70 Photos (continued):



NAPL pathway
fluorescing on
sediment within
Outfall #70



Staining on wall of Outfall
#70 piping (No UV spotlight)



Staining on wall of Outfall #70 piping
fluorescing under UV spotlight

Outfall #71:

Use: Inactive Storm Drain for the old plant

Construction Details: 36" cast iron pipe I.E. = 692.23 ft AMSL

Historical Observations: Sheen historically observed by the City.

Current Observations: No sheen observed from outfall during site investigation. Booms/socks present in the river adjacent to the outfall. Outfall was filled with sand bags. Appeared to be some light blue fluorescence within a joint located directly inside the outfall entrance into the river. The sand bags also appeared to slightly fluoresce a light blue/violet (uncertain if this was biological growth or hydrocarbon contamination).

Proposed Action: Excavate and remove. Fill in excavation with compacted clay and plug hole with adobe bricks, hydraulic cement, and mortar facing.

Photos:



Outfall #71 Photos (continued):



Outfall #71



Light blue
fluorescence within
joint of piping

Sand bags
fluorescing
blue/violet.

Outfall #72:

Use: Inactive Drain for the old plant

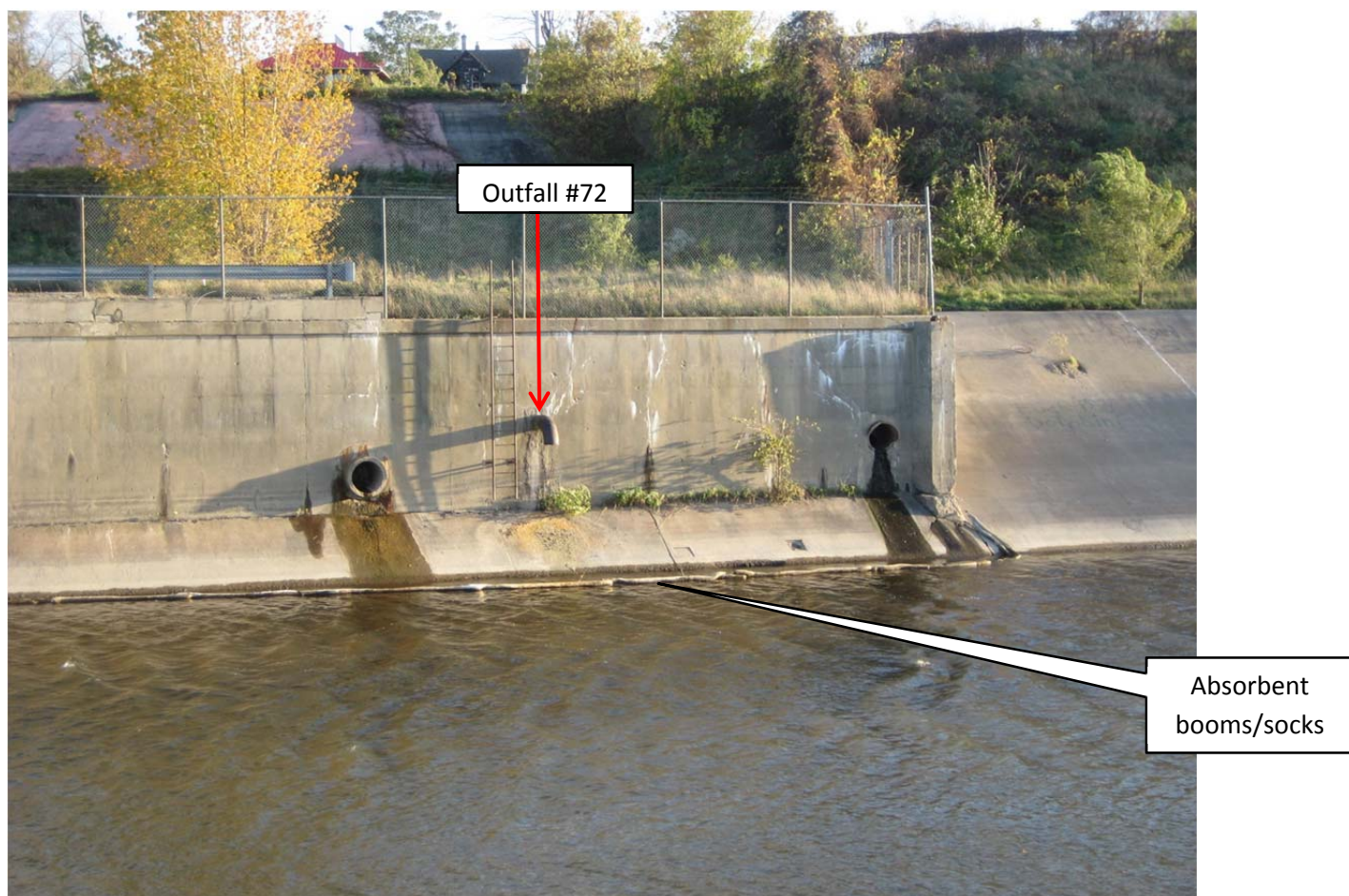
Construction Details: 12" metal gooseneck pipe I.E. = 696.84 ft AMSL

Historical Observations: Sheen historically observed by the City.

Current Observations: No sheen observed from outfall during site investigation. Booms/socks present in the river adjacent to the outfall. Appeared to be some light blue fluorescence within the piping of the outfall.

Proposed Action: To be decided following installation of a test pit. If damage to piping is extensive, excavate and remove. Fill in excavation with compacted clay and plug hole with adobe bricks, hydraulic cement, and mortar facing. If pipeline is salvageable, possibly fix any damage or replace and use for stormwater control.

Photos:



Outfall #72 Photos (continued):



Outfall #73:

Use: Active City Outfall – Pershing Avenue

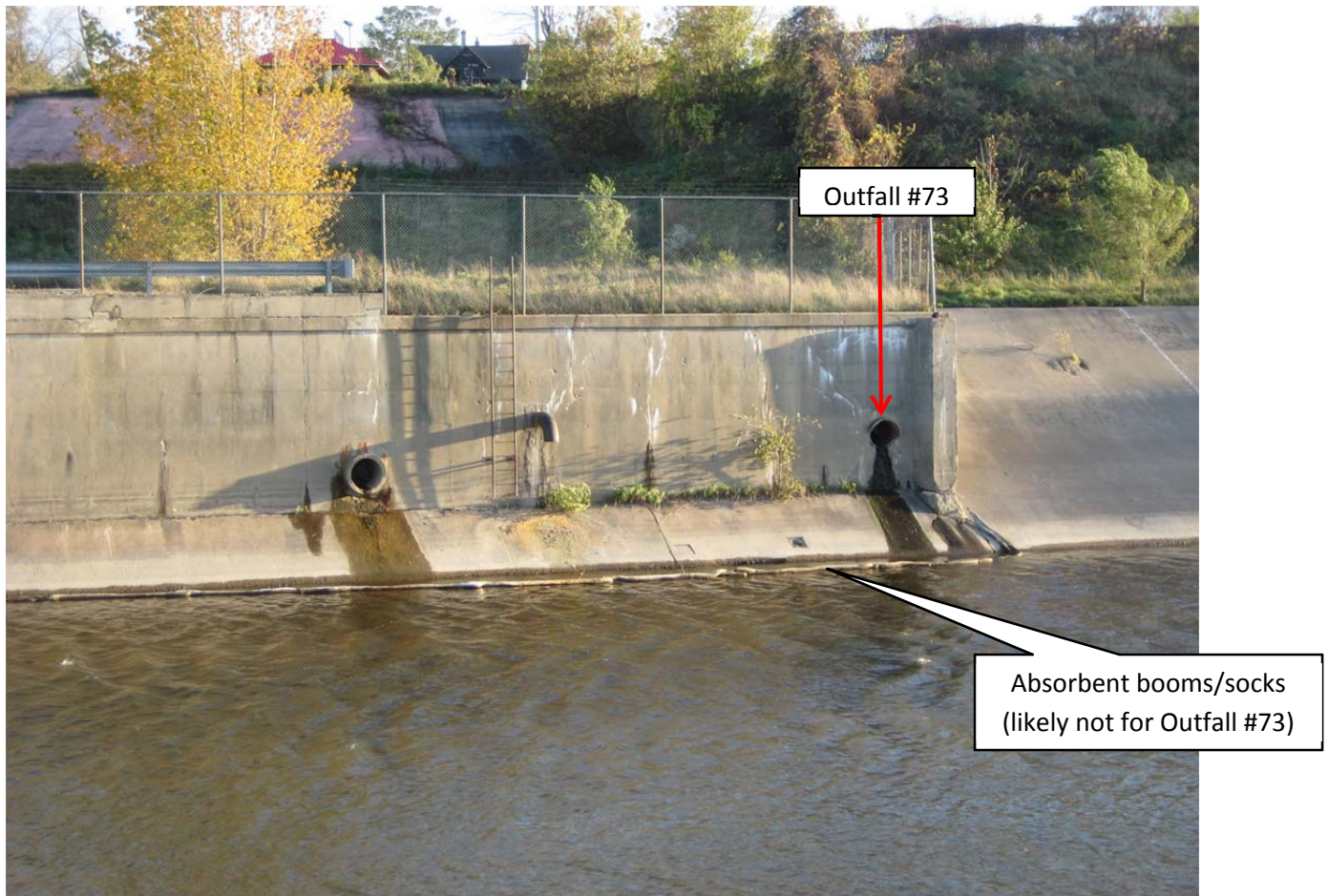
Construction Details: 24" cast iron I.E. 694.95 ft AMSL

Historical Observations: No sheen historically observed on the Flint River. Dye test conducted by City in June/July 2011 indicate outfall is active and drains storm sewer for Pershing Avenue. City reported that this outfall has routinely tested clean.

Current Observations: No sheen, staining, or fluorescence observed on the Flint River during site investigation. Booms/socks in river adjacent to outfall – likely for Outfalls #70 – #72. Flow observed from outfall during rainy conditions.

Proposed Action: No action. Leave in place. Monitor.

Photos:



FLOODWALL & CONCRETE PAVING INSPECTION SUMMARY

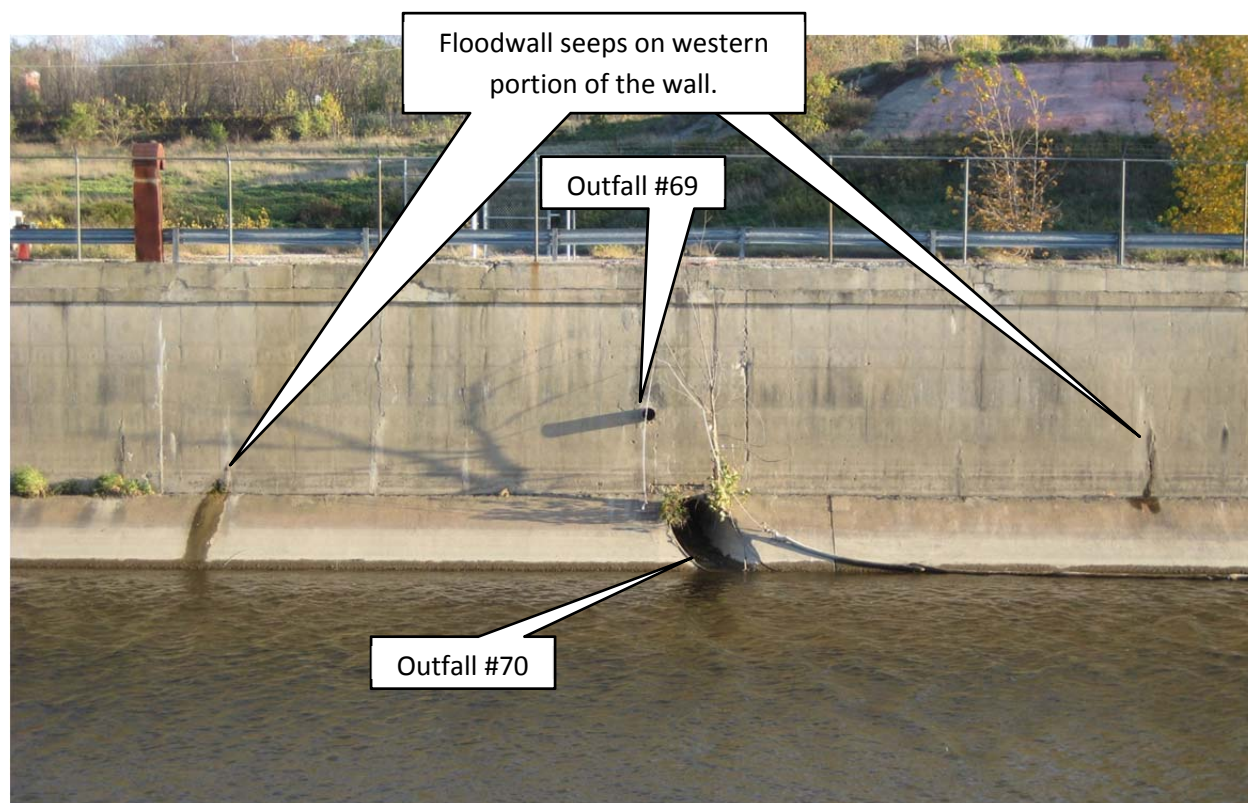
The following sections present observations noted during the floodwall and concrete paving inspection conducted during the site investigation. Based on *United States Army Corps of Engineers (USACEs) Flood Control Channel Improvement Section A As-Built Plans* dated June 10, 1968 (hereafter referred to the USACE Channel As-Built), the "T" type wall and the concrete paving are separate features connected by a ½" expansion joint. Both structures appear to be compromised at certain locations and contributing to the oily sheen historically present on the Flint River.

Floodwall Seeps/Cracks:

Observations: Cracks located on the lower half of the western portion of the floodwall were wet and appeared to be seeping groundwater into the river. No NAPL was observed leaking from the seeps during site investigation. No UV fluorescence was associated with seeps. Vegetation and/or algae were observed growing in and around several seeps. Cracks located on the upper half of the western portion and on the entire eastern portion of the wall appeared dry.

Proposed Action: Seal the floodwall cracks (both seeping and dry) to eliminate possible migration pathways for NAPL.

Photos:



Floodwall Cracks/Seeps Photos (continued):



Floodwall seeps on western portion of the wall.



Eastern portions of the floodwall notably dry

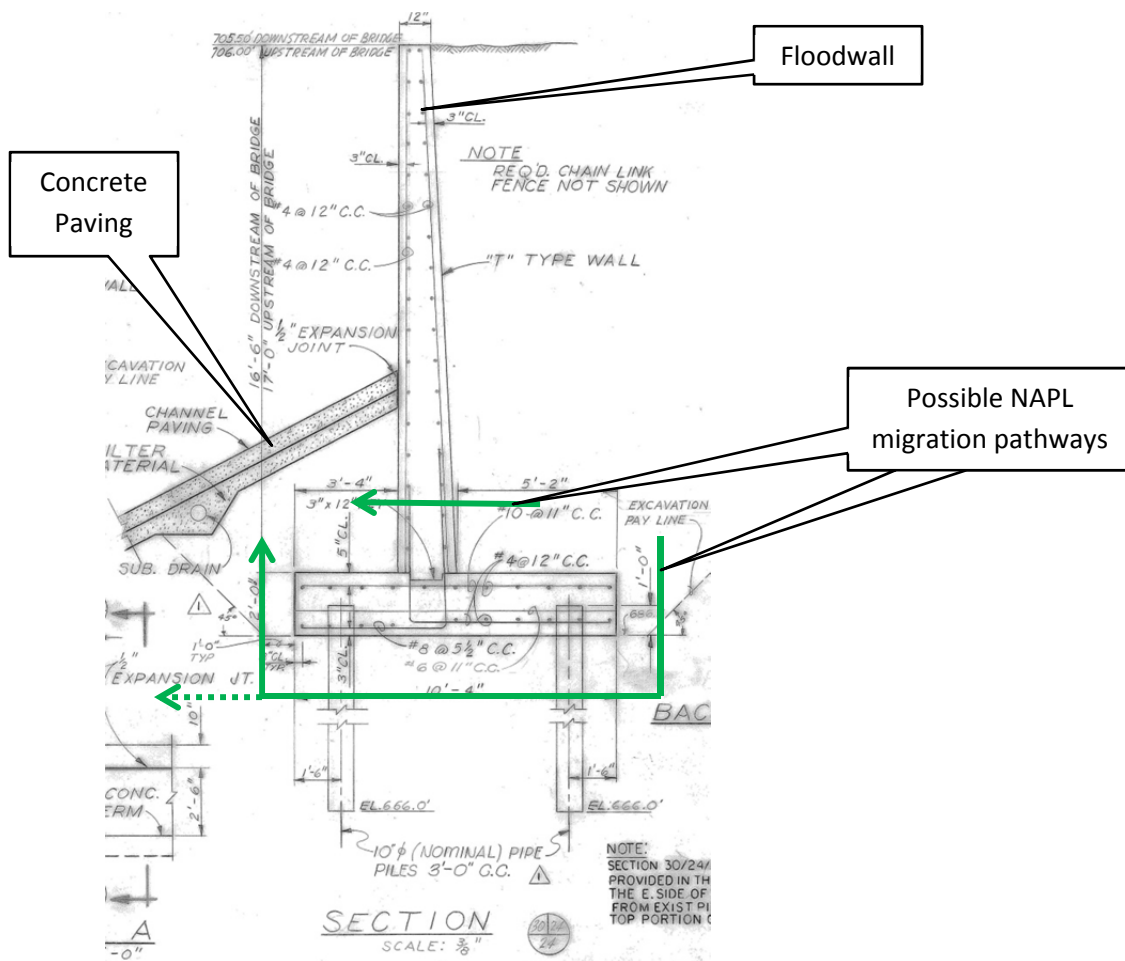
Floodwall Cracks/Seeps Photos (continued):



Vegetation/algae
growing in seeps

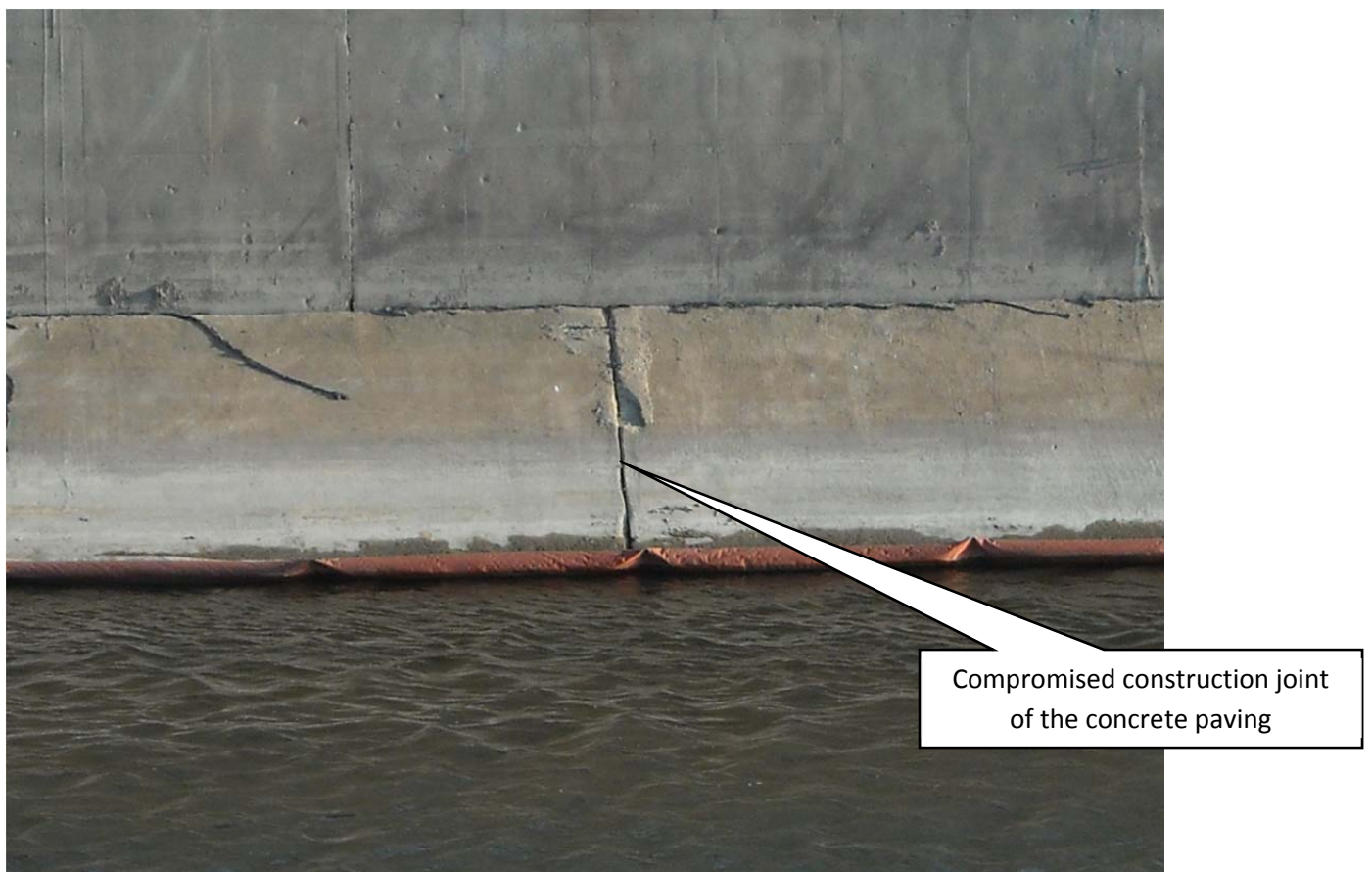
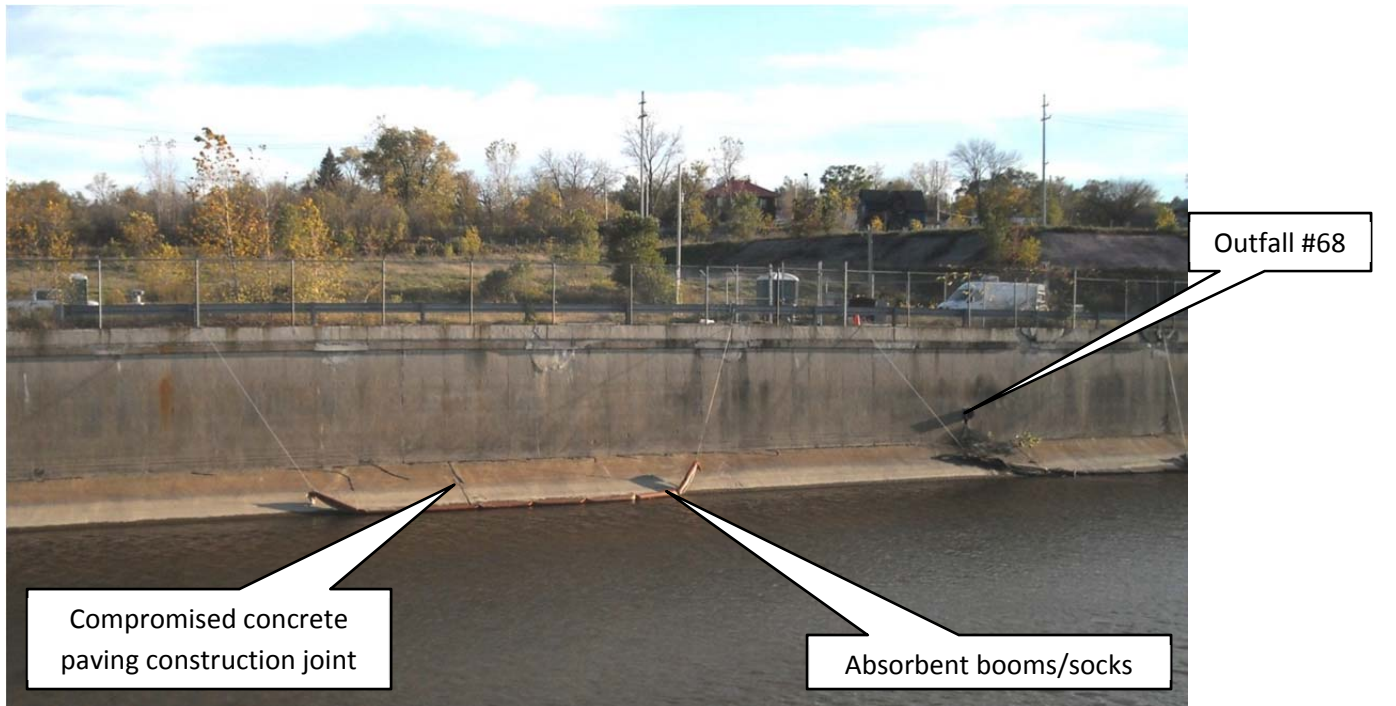
Concrete Paving Construction Joints:

Observations: A majority of the caulking/sealing agent were found to be missing from horizontal and vertical construction joints of the concrete paving. Several joints were visibly eroding with vegetation growing in them. Absorbent booms/socks installed at construction joint located between Outfalls #67 and #68. When flushed with river water, oily sheen flowed from the joint into the river. The same occurred for all vertical construction joints located west of the booms installed at the joint between Outfalls #67 and #68. Because the floodwall and concrete paving are distinct structures, the sheen at the concrete paving joints indicates that NAPL has migrated either beneath or through the floodwall and pooled in the space between the water side of the floodwall and the bottom of the concrete paving. See the detail below from the USACE Channel As-Built.



Proposed Action: Seal all construction joints of the wall adjacent to Parcel A. Joints that are leaking oily sheen will be sealed to prevent on-going NAPL migration into the river, and joints that are not currently leaking oily sheen will be sealed to prevent future migration of NAPL into the river.

Photos:



Concrete Paving Joint Photos (continued):



Compromised concrete paving joint (pictured above) leaking oily sheen



Compromised concrete paving joint (located west of joint pictured above) leaking oily sheen. Fluoresced under UV spotlight.



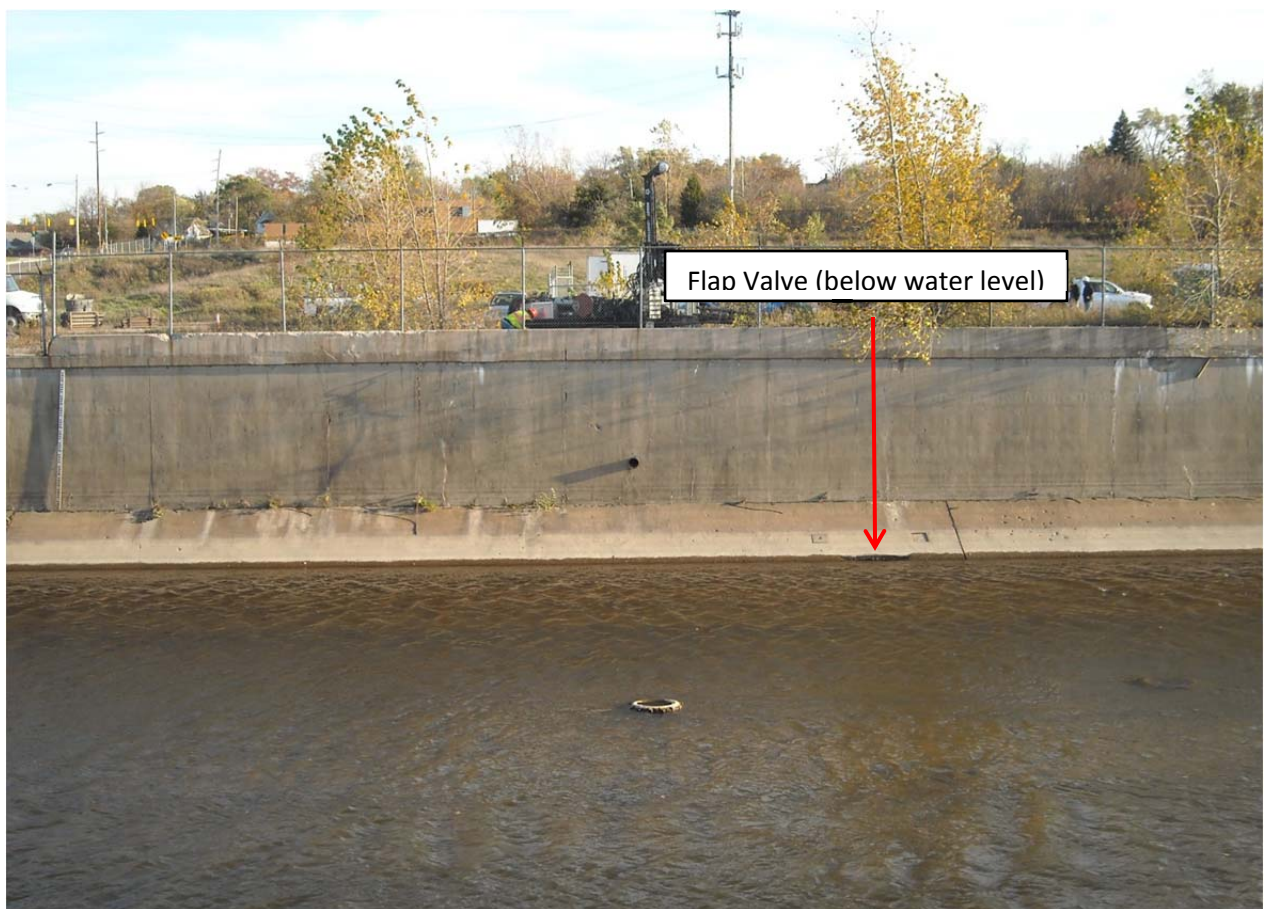
Compromised concrete paving joint with vegetation.

Flap Valves:

Observations: Three flap valves were observed along the base of the floodwall adjacent to Parcel A. The flap valve located between Outfalls #72 and #73 is inoperable. The second flap valve located approximately 50-ft downstream of Outfall #68 is inoperable. The valve is open and moves slightly but is plugged with a log. The third flap valve located approximately 20-ft downstream of Outfall #67 is closed and inoperable.

Proposed Action: Replace the three flap valves with working equipment such that pressure following high river levels may be relieved through the drains, as opposed to cracks and joints that may be sealed as part of the site removal action. Replacement of the flap valves would minimize flushing of river water through cracks and joints.

Photos:



Flap Valve Photos (continued):



SANITARY SEWER VAULT INSPECTION SUMMARY

Observations: The sanitary sewer vault located on the western side of the side was inspected by LKR and City Personnel during the site investigation. The City opened the slab of the sanitary sewer vault but could not see the actual valves associated with piping routed beneath the river or the bypass piping (Outfall #70). The valves are possibly underwater. City does not have records of opening the bypass valve since installed in 1925. The City intends to open the vault up completely and investigate the valves, vault walls, and bypass piping at a later date.

Other than one fluorescing rag, no UV fluorescence was observed within the vault. Smoke testing confirmed that the above-ground vents located nearby and adjacent to the floodwall are connected to the vault. Smoke testing did not result in smoke exiting at any outfalls, including #70. Analytical results from air samples collected within the vault indicate that volatile organic compounds (VOCs) are present and entering either from the sewer mains or through cracks in the vault (note: analytical data to be provided in site investigation report to be submitted at a later date). Solvent-like odors near the sewer vents were notably stronger during site walk activities conducted in May 2011 when the river level was high than during the October 2011 site investigation when the river level was low. This odor difference possibly indicates that the water table in the soils around the vault was higher in May, (from river water backing up the outfalls, etc.) and potentially lifted more VOCs into the vault.

Proposed Action: To be decided following further investigation by the City. Possibly leave in place with no action if vault does not contribute to oily sheen observed at Outfall #70. Possibly use vault as a receptor for relieving contaminated groundwater pressure (see *Stormwater and Groundwater Management* section below).

Photos:



Rag in sewer vault fluorescing under UV spotlight

Sanitary Sewer Vault Photos (continued):



Vault with slab removed



Vents connected to vault

Sanitary Sewer Vault Photos (continued):



Hand cranks associated
with sanitary sewer valves
located below



STORMWATER AND GROUNDWATER MANAGEMENT

In addition to the proposed actions summarized above for the outfalls and floodwall, stormwater should be controlled on-site in order to minimize infiltration. Because the groundwater currently appears to be discharging to the Flint River through wall cracks, construction joints, and outfalls, a potential outcome of sealing the joints and cracks and removing the outfalls is a rising groundwater table. If the groundwater table were to rise, the NAPL would theoretically rise as well and could potentially cause additional NAPL to enter the river at a higher elevation than previously observed. During the first 2-3 days of the Site Investigation field work, the river level was very low and there were no rainfall events for several weeks prior, the level of seeps as observed along the western portion of the wall appeared to be at elevation 696 +/-ft AMSL. The seep elevations appear to correspond with the groundwater elevation measured in monitoring well MW-37 (located near the western side of the floodwall) of 696.46 ft AMSL.

Currently, surface water flows in sheet-like flow patterns south to north off of the hill and ponds in the northern flat portions of the site partially covered by a concrete slab. The most critical surface water ponding occurs near the west end of the wall and adjacent to the west end of the sewer vault. Most of the existing stormwater manholes located in this area are full of standing water (see manholes #2269, #2270, #2271, and #2272 on the surveyed basemap provided below) indicating infiltration is occurring, since these do not freely drain. Infiltration in this area likely contributes to NAPL sheens at Outfall #70 (and possibly at Outfalls #71 and #72). This area also has the lowest groundwater elevation, signaling that water exits at a lower elevation (pipe outfall #70) than anywhere else along the wall, except at joints or cracks. The proposed stormwater management strategy would be to divert run-on to existing active and/or inactive stormwater sewers and thereby eliminate ponding. If existing pipeline associated with Outfall #72 is found to be salvageable following cleaning, dye testing, and installation of a test pit, this system may be fixed/replaced and used for stormwater control. Alternatively, if existing pipeline associated with Outfall #72 is extensively damaged, stormwater may be diverted to active City outfalls (i.e. Chevrolet Avenue or Pershing Street storm sewer systems).

In May of 2011, the river level was observed to be above all of the outfalls. River water is likely allowed to pass through the wall into the backfill soils behind the wall whenever the river rises above the outfall inverts. Because Outfall # 70 is the lowest elevation (686.98 ft AMSL), the area behind this outfall likely becomes flooded with river water, which in turn comes into contact with NAPL. Then as the river level subsides, all groundwater in the flooded zone is free to discharge back into the river via the outfalls, cracks, and joints.

As stated in the above sections outlining the proposed Phase I outfall remedies, some limited excavation of NAPL contaminated soils is recommended during installation of test pits at Outfalls #71 and #72. Because this area is known to produce frequent sheen on the river at Outfall #70, it may be prudent to remove these source soils. Clean backfill would be used to fill in the excavation.

The proposed groundwater management plan includes the installation of groundwater relief pipeline(s) within the clean backfill that would discharge to the sanitary sewer vault located nearby. The relief

pipelines would minimize the head pressure differential between the river and the groundwater table that likely results in the discharge of groundwater/NAPL to the river via outfalls, joints, and cracks. The exact locations and depths of the pipelines would be determined during the removal action design phase.

MONITORING

Following completion of Phase I of the proposed removal action, monthly or quarterly outfall monitoring events would be conducted to observe if sheen is still present on the river or walls, and if so, where the sheen is emanating from along the floodwall. In addition, a complete round of groundwater and product level elevation measurements would be collected to assess the impact of sealing groundwater/NAPL release points into the river (i.e. outfalls, joints, and cracks). Based on these monitoring results, LKR would then make future recommendations, as necessary, for either Phase II actions, boom deployment, NAPL collection, or other appropriate actions yet to be determined.

SOIL BORING DATA:

SOIL BORING DESIGNATION	NORTHING	EASTING	GROUND ELEVATION	POINT NUMBER
SB-01	550490.0	1329867.8	706.1	2453
SB-06	550497.6	1329881.2	706.1	2457
SB-08	550508.6	1329908.2	706.0	2452
SB-12	550514.0	13298745.9	706.2	2425
SB-13	550550.1	13298842.5	706.3	2426
SB-14	550630.4	13298987.2	706.4	2427
SB-15	550722.5	13299134.5	705.1	2428
SB-16	550413.3	13298792.7	706.3	2447
SB-17	550466.7	13298870.9	707.3	2448
SB-18	550558.8	13299027.8	707.4	2431
SB-19	550649.8	13299172.0	706.7	2429
SB-20	550275.9	13298876.1	723.6	2446
SB-21	550341.0	13298956.1	720.5	2444
SB-22	550448.9	13299083.5	715.6	2433
SB-23	550467.6	13299204.5	721.8	2439
SB-24	550529.7	13299137.2	714.1	2440
SB-25	550296.6	13299004.8	725.7	2445
SB-26	550496.6	13299047.4	712.2	2432
SB-27	550452.7	13299002.9	713.5	2441
SB-28	550402.3	13298947.4	715.4	2443
SB-29	550417.4	13298683.4	706.3	2449
SB-30	550326.6	13299198.3	729.1	2451
SB-31	550221.0	13298581.6	739.0	2450
SB-32	550592.8	13299092.9	707.5	2430
SB-33	550397.7	13298990.6	717.3	2442
SB-34	550450.5	13299126.7	718.8	2434
SB-34A	550450.5	13299126.7	718.7	2435
SB-35	550476.4	13299167.2	719.8	2438
SB-36	550404.3	13299104.4	719.3	2437
SB-37	550440.6	13299127.1	719.3	2436

MONITORING WELL DATA:

MONITORING WELL DESIGNATION	NORTHING	EASTING	CASING ELEVATION	GROUND ELEVATION	POINT NUMBER
MW-01	550589.3	13298864.6	707.08	706.3	1012
MW-06	550481.5	13298912.4	709.76	707.9	1050
MW-12	550538.2	13299091.4	713.92	712.9	1046
MW-13	550478.2	13299020.0	713.43	712.6	1049
MW-19	550730.3	13299098.3	703.57	703.9	1001
MW-23	550491.1	13298737.9	705.92	706.3	1016
MW-25	550331.5	13298832.6	723.80	722.4	1028
MW-35	550372.1	13299082.3	721.22	720.4	1038
MW-36	550590.3	13299097.3	720.36	718.5	1033
MW-37	550503.7	13298700.9	705.54	706.1	1053
MW-38	550497.3	13299132.7	717.71	716.4	1045
MW-45	550495.7	13298730.9	706.18	706.4	1017
MW-46	550538.1	13298794.8	705.79	706.1	1013
MW-48	550524.5	13299020.4	706.07	706.4	1009
MW-49	550524.9	13298946.3	706.00	706.3	1008
MW-51	550657.7	13299020.1	704.05	704.6	1004
MW-51A	550662.0	13299020.5	707.29	704.3	1005
MW-54	550536.8	13298775.4	709.50	706.3	1021
MW-550	550493.3	13299128.7	718.99	716.7	1042
MW-555	550487.1	13299131.9	719.86	717.0	1041
MW-560	550396.2	13299006.1	720.50	718.4	1037
MW-565	550392.4	13299002.3	720.98	718.5	1034
MW-57	550278.6	13298657.1	740.71	738.2	1029
MW-580	550407.3	13298718.2	705.91	706.3	1025
MW-585	550407.1	13298713.4	705.79	706.2	1024
MW-59	550489.2	13298734.5	705.91	706.3	1020
MW-60	550600.8	13298857.1	705.97	706.3	2455
MW-61	550687.9	13299000.4	703.06	703.4	2456
MW-62	550578.3	13298949.2	705.88	706.4	2454

BENCHMARK DATA TABLE

NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
BM 33	550439	13299344	723.69	SET RAILROAD SPIKE IN NORTH FACE OF LIGHT POLE ON THE WEST SIDE OF CHEVROLET AVENUE, 120'± NORTH OF OLD RAILROAD GRADE
BM 35	550669	13299209	709.74	SET CHISELED "X" ON NORTHEAST FLANGE BOLT OF HYDRANT ON THE WEST SIDE OF CHEVROLET AVENUE, 75'± SOUTH OF BRIDGE OVER THE FLINT RIVER

TRAVERSE POINT DATA TABLE

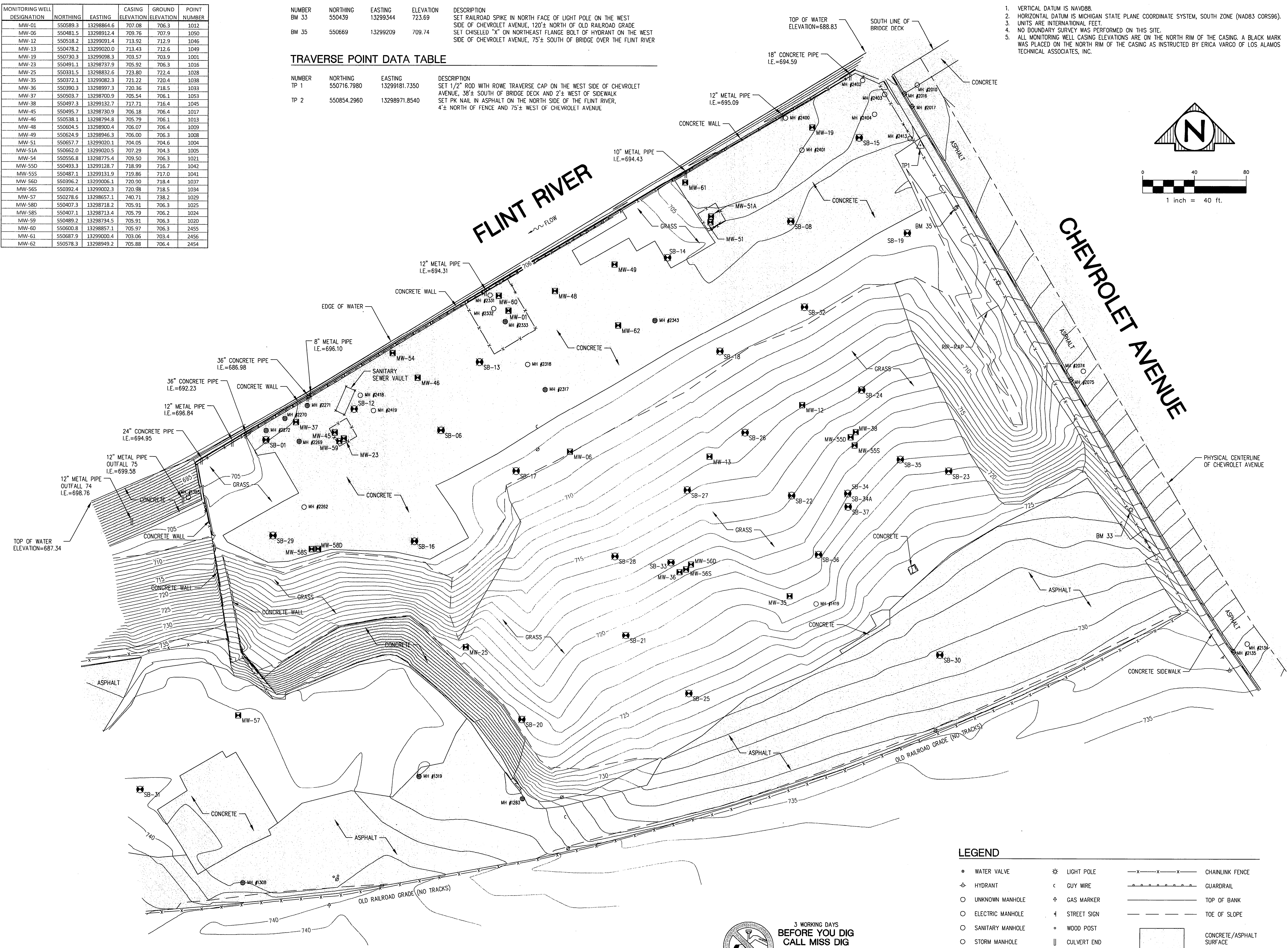
NUMBER	NORTHING	EASTING	DESCRIPTION
TP 1	550716.7980	13299181.7350	SET 1/2" ROD WITH ROWE TRAVERSE CAP ON THE WEST SIDE OF CHEVROLET AVENUE, 38'± SOUTH OF BRIDGE DECK AND 2'± WEST OF SIDEWALK
TP 2	550854.2960	13298971.8540	SET PK NAIL IN ASPHALT ON THE NORTH SIDE OF THE FLINT RIVER, 4'± NORTH OF FENCE AND 75'± WEST OF CHEVROLET AVENUE

NOTES:

1. VERTICAL DATUM IS NAVD83.
2. HORIZONTAL DATUM IS MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE (NAD83 COR596).
3. UNITS ARE INTERNATIONAL FEET.
4. NO BOUNDARY SURVEY WAS PERFORMED ON THIS SITE.
5. ALL MONITORING WELL CASING ELEVATIONS ARE ON THE NORTH RIM OF THE CASING. A BLACK MARK WAS PLACED ON THE NORTH RIM OF THE CASING AS INSTRUCTED BY ERICA VARGO OF LOS ALAMOS TECHNICAL ASSOCIATES, INC.

MANHOLE DATA:

MH# 1283 TYPE: STORM COVER: FLAT GRATE RM= 737.01 12" RCP E INV.=723.61 12" VCP NW INV.=723.46 12" CIP NW INV.=732.31	MH# 2134 TYPE: STORM COVER: SOLID RM= 732.22 12" RCP E INV.=727.22 15" RCP S INV.=723.67 15" RCP N INV.=717.22 12" RCP W INV.=726.92	MH# 2333 TYPE: STORM COVER: FLAT GRATE RM= 732.22 6" PVC W INV.=702.81 18" RCP N INV.=696.01
MH# 1308 TYPE: STORM COVER: SOLID RM= 738.27 8" VCP E INV.=735.77	MH# 2135 TYPE: STORM COVER: CURB INLET RM= 731.90 12" RCP E INV.=727.20	MH# 2343 TYPE: STORM COVER: FLAT GRATE RM= 706.14 FULL OF WATER NO PIPES VISIBLE
MH# 1319 TYPE: STORM COVER: FLAT GRATE RM= 735.92 12" CIP SE INV.=733.72 12" RCP W INV.=733.72	MH# 2262 TYPE: ELECTRIC COVER: SOLID RM= 706.31 12" RCP E INV.=727.20	MH# 2400 TYPE: OTHER COVER: SOLID RM= 703.90 12" CIP N INV.=694.90
MH# 1355 TYPE: SANITARY COVER: SOLID RM= 701.52 8" VCP S INV.=697.92 TOP OF SLUDGE=696.42 NO OTHER PIPES VISIBLE	MH# 2269 TYPE: STORM COVER: FLAT GRATE RM= 708.14 FULL OF WATER NO PIPES VISIBLE	MH# 2401 TYPE: OTHER COVER: SOLID RM= 703.88 12" CIP N INV.=696.38
MH# 1419 TYPE: SANITARY COVER: SOLID RM= 722.16 TOP OF WATER=703.10 NO PIPES VISIBLE	MH# 2270 TYPE: STORM COVER: FLAT GRATE RM= 706.00 FULL OF WATER NO PIPES VISIBLE	MH# 2402 TYPE: SANITARY COVER: SOLID RM= 704.84 60" RCP E INV.=688.14 60" RCP W INV.=688.14 6" VCP SE INV.=691.84
MH# 2010 TYPE: STORM COVER: SOLID RM= 705.63 12" RCP E INV.=700.53 24" RCP W INV.=694.83 15" RCP S INV.=695.18	MH# 2271 TYPE: STORM COVER: FLAT GRATE RM= 706.06 FULL OF WATER NO PIPES VISIBLE	MH# 2403 TYPE: SANITARY COVER: SOLID RM= 705.26 24" RCP E INV.=694.72 24" RCP N INV.=694.67
MH# 2015 TYPE: STORM COVER: CURB INLET RM= 705.36 12" RCP E INV.=694.86 12" RCP S INV.=700.36 24" RCP W INV.=694.86	MH# 2272 TYPE: STORM COVER: FLAT GRATE RM= 706.06 FULL OF WATER NO PIPES VISIBLE	MH# 2404 TYPE: STORM COVER: SOLID RM= 704.92 24" RCP E INV.=694.72 24" RCP N INV.=694.67
MH# 2017 TYPE: STORM COVER: CURB INLET RM= 705.29 12" RCP N INV.=700.89	MH# 2317 TYPE: STORM COVER: FLAT GRATE RM= 705.96 FULL OF WATER NO PIPES VISIBLE	MH# 2413 TYPE: SANITARY COVER: SOLID RM= 705.86 6" VCP SE INV.=692.23 6" VCP N INV.=692.18
MH# 2074 TYPE: STORM COVER: SOLID RM= 713.67 12" RCP E INV.=708.27 15" RCP N INV.=700.47 12" RCP W INV.=708.67 15" RCP S INV.=707.42	MH# 2318 TYPE: ELECTRIC COVER: SOLID RM= 706.39	MH# 2418 TYPE: SANITARY COVER: SOLID RM= 706.33 ACCESS COVER TO VAULT
MH# 2075 TYPE: STORM COVER: CURB INLET RM= 713.24 12" RCP E INV.=708.49	MH# 2332 TYPE: OTHER COVER: SOLID RM= 706.33 60" RCP INV.=687.73 8" VCP S INV.=696.83	MH# 2419 TYPE: SANITARY COVER: SOLID RM= 706.29 N/A. S INV.=688.99 N/A. S INV.=686.99 CAN NOT DETERMINE SIZE OR MATERIAL OF PIPES



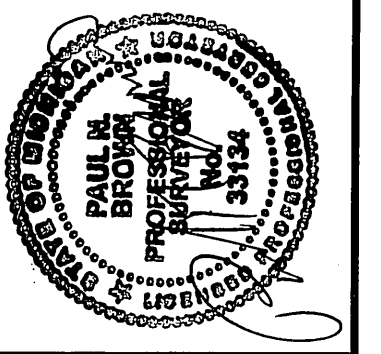
LEGEND

- WATER VALVE
- HYDRANT
- UNKNOWN MANHOLE
- ELECTRIC MANHOLE
- SANITARY MANHOLE
- STORM MANHOLE
- ⊠ CURB CATCHBASIN
- UTILITY POLE
- ☆ LIGHT POLE
- GUY WIRE
- GAS MARKER
- STREET SIGN
- WOOD POST
- || CULVERT END
- FENCE GATE
- △ TRAVERSE POINT
- CHAINLINK FENCE
- GUARDRAIL
- TOP OF BANK
- TOE OF SLOPE
- CONCRETE/ASPHALT SURFACE

PREPARED FOR
LATA-KEMRON REMEDIATION, LLC
CHEVY IN THE HOLE
PART OF SECTION 13; T7N-R6E, CITY OF FLINT,
GENESEE COUNTY, MICHIGAN

REV:

SHT# 1 OF 1
JOB No: 11C0158



PLAN DATE: October 25, 2011
PROJECT MGR: PNB
REVIEWER: PNB
SCALE: 1" = 40'

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